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REVIEW and BUYERS' GUIDE ISSUE

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TABLE OF CONTENTS

REVIEW SECTION

BUYERS' GUIDE SECTION

How to Use

THE REVIEW AND BUYERS' GUIDE

TO better describe the scope of the REVIEW of the PAINT INDUSTRY, which has been published by PAINT & VARNISH PRODUCTION since 1952, the title of this work has been changed to the "REVIEW and BUYERS' GUIDE". When used in conjunction with previous (and subsequent) Reviews, the series forms a valuable index to the technical literature and a source of information relating to the various phases of paint technology.

The format of the "REVIEW and BUYERS' GUIDE" consists of ten sections covering the following topics: Synthetic Resins, Latex Emulsions, Pigments, Solvents, Drying Oils and Fatty Acids, Intermediates, Additives, Production, Testing, Architectural and Industrial Finishes.

The Table of Contents provides an overall picture of the subject matter covered in the work. Both the Authors' Index and Subject Index have been included for the reader's benefit.

The specific item refers the reader to the journal reference for further reading. Journal references appear at the end of each item. For example, the reference PVP, 47, #2, 40 (1957) is broken down as follows:—

- PVP—Paint & Varnish Production (For codes of all publications used in this Review see page 9).
- 47—Volume 47
- #2—2nd month of year (February)
- 40—The subject referred to begins on page 40

A new feature of this year's "REVIEW and BUYERS' GUIDE" is a digest of important raw materials and equipment (see page 112) introduced to the coatings industry during 1957. A list of sales agents (see page 141) representing raw material and equipment suppliers has also been included for the first time. In addition the Raw Material and Equipment Directory, Trade-Name Directory, Company Directory, and Trade Associations Directory have been expanded considerably over previous years' listings.

PUBLICATIONS

Below are the principal journals and their codes used in abstracting items which appear in this Review. All other abbreviations adhere to standards set by *Chemical Abstracts*.

AC	Analytical Chemistry
APJ	American Paint Journal
ASTM Bull.	American Society for Testing Materials Bulletin
BP	British Patent
CA	Chemical Abstracts
Chem. Tech.	Chemische Technik
CP	Canadian Patent
CPVM	Canadian Paint and Varnish Magazine
FL	Farbe und Lack
Ger. P.	German Patent
IEC	Industrial and Engineering Chemistry
JACS	Journal of the American Chemical Society
JAOCS	Journal of the American Oil Chemists Society
JCS	Journal of the Chemical Society (London)
J. Chem. Phys.	Journal of Chemical Physics
J. Org. Chem.	Journal of Organic Chemistry
JOCCA	Journal of the Oil and Colour Chemists Association
JPS	Journal of Polymer Science
MC	Makromoleculare Chemie
MP	Modern Plastics
OD	Official Digest of the Federation of Paint and Varnish Production Clubs
Org. Fin.	Organic Finishing
PI	Paint India
PIM	Paint Industry Magazine
Pitt. e Ver.	Pitture e Vernici
PM	Paint Manufacture
POCR	Paint, Oil and Chemical Review
PPV	Peintures, Pigments et Vernis
PT	Paint Technology
PVP	Paint and Varnish Production
USP	United States Patent
Verf.	Verfkroniek

INVESTIGATE THE BENEFITS OF BAKELITE BRAND RESINS FOR COATINGS...

PHENOLIC . . . Aluminum pigmented coatings based on Bakelite Phenolic Resins are typical of the many uses for these resins. In use for many years on the San Francisco Bay Bridge, they resist chemicals, corrosion, abuse. Varnishes based on these phenolic resins serve a long, useful life on floors, in gymnasiums and exterior house sidings . . . wherever durability is required.

It pays to formulate with

VINYLS . . . Here is a typical application of coatings based on Bakelite Vinyl Resins. This off-shore drilling platform must resist moisture, salt water, corrosive atmospheres and rough usage. Other uses include flood control dams . . . Navy destroyers . . . many interior and exterior industrial applications.

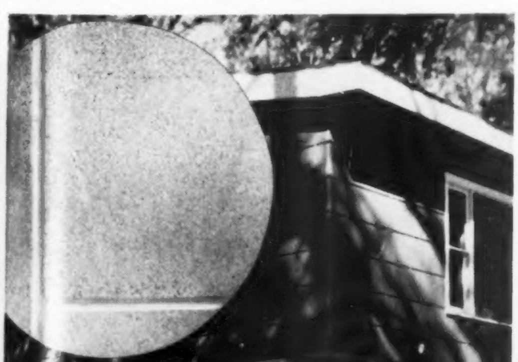
PLASTISOLS . . . In this application of plastisols based on Bakelite Vinyl Resins, the manufacturer eliminated a costly polishing and plating operation . . . gave a soft, smooth, cushioned grip to his product. You can have all the well-known Vinyl properties and a selection of application methods . . . dip coating, slush molding and rotational molding.

ORGANOSOLS... Typical toughness... a coating that looks like leather, wears like iron. It's the patented "Armorhide®" finish made by John L. Armitage & Co. This organosol coating based on BAKELITE Vinyl resins gives a sturdy finish in unlimited colors. It also assures excellent protection against corrosives, temperature extremes and abrasion. With these resins, metal can also be coated before forming.

EPOXY... A typical example of a beautiful coating for inexpensive sheet or cast metal is this attractive brass colored finish. Based on BAKELITE Epoxy Resins, the coating is highly resistant to impact damage, scratching and discoloration. It protects and beautifies the bezel, base and decorative strips on this RCA television set. Epoxies also offer excellent protection for pipes... drums... tanks.

BAKELITE PLASTICS
BRAND

VINYL ACETATE LATEX... The attractive appearance of the cement block exterior of this house is typical of the excellent performance of coatings based on BAKELITE Vinyl Acetate Latex. Months of extreme cold, piercing blizzards, ice formations, and summer heat have had no damaging effect. Proved in 3 years of tests from Canada to the tip of Florida. And, it's a fine coating for interiors too!



There are more quality resins at one source...

plus... *the latest formulation information*

plus... *specialized technical representatives*

plus... *outstanding research and development facilities*

plus... *fast, dependable nationwide service*

VINYLS
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PHENOLICS

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SYNTHETIC RESINS

TO single out one development in resin technology during 1957, one must consider the introduction of polycarbonates, a new class of resins. These polycarbonate resins are the condensation product of phosgene and bisphenol A and have potential interest for varnishes and coatings. Among the properties these resins exhibit are high impact and tensile strength, good heat resistance, good electrical properties, low water absorption and non-flammability.

In order to combat the inroads that latex emulsion coatings are making in the architectural field, alkyd producers have marketed during 1957 alkyd emulsion vehicles that can be formulated into flat paints with quick drying properties, good adhesion, high hiding, and free of solvents and odors. These paints are recommended for interior walls and masonary surfaces.

Two thixotropic vehicles which are said to be compatible with medium and long oil alkyds for formulating "jelled" paints, a do-it-yourself item, have been introduced in 1957. These thixotropic vehicles are recommended for manufacturing flat and semi-gloss architectural finishes and offer easier handling, wider compatibility, better brushability and good weather resistant properties.

Two polyurethane products created considerable interest during 1957. Both the one and two component systems were available to paint manufacturers. The one-component system is said to have good storage stability. Both systems can be used to formulate finishes for a variety applications—industrial coatings, maintenance finishes, floor finishes, marine finishes, wire coatings, and architectural finishes. Properties claimed of polyurethane coatings are high durability, corrosion resistance, rapid drying, good flexibility, high impact, resistance to alkali and certain acids, and gasoline.

Other significant developments include a silicone resin for high temperature coatings, a light colored phenolic vehicle which exhibits good alkali and acid resistance, a modfied styrene resin for gold bronze vehicles, and a liquid polybutadiene, which can be modified with drying oils or alkyd resins.

GENERAL

Proteins

CASEIN can be stabilized against putrefaction by oxidation and chlorination, presumably on the phenolic portions. USP 2,757,171. Cyanoethylation at an alkaline pH with acrylonitrile is also claimed to yield protein derivatives which are resistant to microbial or enzymatic attack. Formaldehyde or a formaldehyde condensate which does not gel the protein enhances this resistance. USP 2,775,565. The emulsifying power of casein has been found to decrease on storage at low temperatures. Kolloid Zh. *18*,443 (1956); CA, *51*,802 (1957).

Rosin and Derivatives

HARD resins useful in protective coatings result from the low temperature acid polymerization of rosin modified at an intermediate stage by the addition of aldehydes or their derivatives. The products have high acid values and softening points. USP 2,773,859. DIELS-ALDER reactions of rosin with maleic acid or anhydride are improved when the rosin is acid isomerized to a specific rotation of −15° before product formation is begun. USP 2,776,277. AIR DRYING resins and varnish intermediates are formed when rosinamine is reacted with unsaturated fatty acids to a low acid value. Styrenated fatty acids, maleated acids and dimerized acids have also been used. USP 2,777,837.

KAMATH and Sheyte state that rosin reacts with phenol only at elevated temperatures with acid catalyst. Perchloric acid is the most efficient, but the reaction is accompanied by decarboxylation, disproportionation, and lactone formation. The main reaction is at the double bonds and no esters are formed, although esterification proceeds readily with methylol phenols. When rosin is treated with phenol and formaldehyde, different products can result, depending on the source of formaldehyde. These modified rosins esterify glycerol more rapidly than rosin itself. PI *6*, #7,23 (1956). PALLAUF notes that the dulling of films from vehicles rich in rosin (often noted within 24 hours) is due to fine wrinkle formation caused by surface drying. It can be exaggerated in a foul atmosphere, but is suppressed by the use of cobalt driers. FL *62*, 424 (1956). ROSIN acids in admixture with fatty acids can be determined in 45 minutes by refluxing with butanol and butyl sulfuric acid. Linder and Persson have tested the method over the entire range of admixtures and claim a deviation of 0.1%. JAOCS *34*, 24 (1957).

Natural Resins

IN A REVIEW of the published methods for the identification of shellac, Vollman claims that the strong violet color developed by the er throllacin with base is best, but the most positive identification depends on the isolation of sodium aleuritate. Color reactions for the various grades of shellac and for other natural resins are tabulated. JOCCA *40*, 175 (1957). MALYAN described the esterification of natural resins such as rosin and Congo copal with glycerine. PT *21*,121 (1957). COPAL has been fractionated and yielded a polymer of $(C_{30}H_{48}O_3)_n$, claimed to be C-C linked hydroxy acids. PPV *33*,319 (1957).

Miscellaneous

POLYMERIC zirconium esters have been made from zirconium (IV) chloride and ethanol, forming tetraethyl zirconate, which is then reacted with fatty acids. The oily residues are film forming. BP 755, 558. SCHLENKER reviewed the reactions of aluminum alcoholates with varnish raw materials. Kunststoffe, *47*,7 (1957). THE NEW polycarbonate resins, possessing excellent mechanical and electrical properties, are heat and chemical resistant. PI *6*,#8,28 (1956).

RESINOUS products can be prepared by polymerization of cashew nut liquid, reaction with aldehydes, and by mixed polymerization-etherification with phenol and formaldehyde. The long chain offers internal plasticization to the resins which are acid and alkali resistant. Oates points out their increasing use in insulating varnishes and as plasticizers in water resistant amine resin compositions. Industrial Chemist *32*,323 (1956).

DIETHYLENE glycol dicarbanate has been condensed with formaldehyde in aqueous solution to yield emulsions useful for stiffening synthetic resins and yielding high gloss paper coatings. USP 2,774,746.

FERRIC halides have been reacted with alcohols in the presence of ammonia. The organic compound forms a polymeric oxide coating on heating. USP 2,789,923.

THE COPOLYMERIZATION of butyl acrylate and vinyl pyridine has been studied. JPS *25*,#279 (1957).

GRAFT polymers produced by milling natural rubber with various monomers are described by Bateman. The possibilities for large scale operation of the process are indicated. IEC *49*, 704 (1957).

ACRYLICS

Acrylonitrile

MINO has copolymerized acrylonitrile with styrene in aqueous suspension with an organic catalyst. The concentration of the acrylonitrile in the aqueous phase is constant at low conversions but decreases between 25 and 90% conversion. The overall rate is constant over the initial 35% of the reaction following an induction period, increases slightly, and then decreases rapidly after 90%. The dissolved acrylonitrile continually diffuses into the beads. Reactivities are the same as in bulk polymerization when the partition of the nitrile between the phases is considered, but in bulk reactions a marked acceleration in rate occurs at high conversions. JPS *22*,369 (1956).

LA COMBE suggests that the color formation of polyacrylonitrile with amines is due to cyclic imidine formation. JPS *24*,152 (1957). THE HEAT stability of acrylonitrile resins is enhanced by the use of calcium vinyl phosphonate and calcium acrylate stabilizers. USP 2,784,169. A MIXTURE of ethylene and propylene carbonates is suggested as a solvent for polyacrylonitrile. SOLUTIONS in the former can't be cooled below 35°C, while the latter alone is a nonsolvent. BP 734,527.

Latices

THE EMULSION polymerizations of methyl acrylate and vinyl acetate have been compared. The rate and degree of polymerization of both reach a maximum at certain concentrations of anionic emulsifiers, and nonionic agents yield more stable emulsions of a higher degree of polymerization with methyl acrylate. Sodium alginate can be used with either at an alkaline pH, while polyvinyl alcohol and sodium polyacrylate have the same effect with both monomers. A large amount of nonionic or a small amount of anionic surfactant is needed for a stable emulsion of polymethyl methacrylate, and a relatively large amount of soluble polymer is required. Chem. High Polymers (Japan) *12*,102 (1955); CA *51*,1645 (1957).

AN INTERPOLYMER of 2-ethylhexyl acrylate, acrylonitrile, styrene, and methacrylic acid is claimed to produce a latex with a low fusion temperature. The acrylonitrile and part of the styrene are polymerized first, with the remainder of the ingredients added during the latter stages. USP 2,767,153. ACRYLATE copolymers containing a basic salt of a polyvalent metal are said to render asbestos shingles resistant to efflorescence, weathering and staining. USP 2,778,283.

General

UNSATURATED long chain acrylates have been prepared from drying oils by reduction to the alcohols and transesterification with ethyl acrylate. The esters can be polymerized and show excellent drying properties. CA *51*,10089 (1957).

A STYRENE-acrylate polymer containing acrylic acid mixed with an epoxy resin condensate has been claimed to form a wide range of protective films. CP 534,261.

THE SUPPOSED copolymer of allylamine and methacrylic acid is claimed to be essentially an allylammonium polymethylmethacrylate. Jones states that most of the allylamine can be steam distilled from the compound. JPS *25*,237 (1957).

GRAHAM has reacted an amine-terminated polystyrene with acrylate copolymers containing an isocyanate group. With excess isocyanate, most of the amine groups reacted within 48 hours at low temperatures. The presence of the side chains permits the suspension of some homopolymer in dilute solutions, and the graft behaves more like a mixture of homopolymers than a copolymer in its bulk properties. The method is of general interest, since it allows control of both the length of the backbone and the number of attached polymer side chains. JPS *24*,367 (1957).

ALKYDS

Physical Properties

ELECTRON microscopy reveals heterogeneity in thin films of polymers. Ostacoli and Nasini report good films from chloroprene-short oil alkyd combinations when over 80% chloroprene is present, and from vinyl chloride-acetate copolymer-alkyd combinations containing over 50% vinyl. Etch patterns with caustic have also been studied as an index of stability. Chimica e Industria (Milan) *38*,839 (1956); CA *51*,4172 (1957).

THE ELASTIC contraction, stress relaxation and softening temperatures of alkyd paint films were measured by Imai. The strain is completely recovered at temperatures above the softening point, but the speed of recovery was greatly dependent on time and temperature. J. Chem. Soc. Japan *58*,688 (1955); CA *50*,8223 (1956).

INOUE studied the shrinkage of urea-alkyd baking combinations by noting the amount of bend of thin aluminum foil substrates. Broad maxima of shrinkage and Young's modulus occur with concentration variations. Addition of TiO_2, $CaCO_3$ or $BaSO_4$ increase these values, but talc or zinc oxide tends to decrease them with increasing amounts. J. Chem. Soc. Japan *59*,124 (1956); CA *50*,16132 (1956).

FREIER and Geilenkirchen examined the viscosity of alkyd resins in binary and ternary solvent mixtures, using different instruments. The effects of concentration and temperature are tabulated, and a nomogram for correlating different instruments is derived. FL *63*,105 (1957).

DINTENFASS determined the vi- cosities of various paint vehicles i different solvents and uses a co cept of free volume and a hydr dynamic coefficient to explain th rheological phenomena. Viscosit is largely dependent on the solven power, which controls thixotrop and dilatancy of a vehicle. Coilin and aggregation of the polyme molecules cause these effects. Equilibrium and non-equilibrium systems are discussed, including skinning, gelation and colloidal shock due to local solvent compositio being different from the bulk composition. JOCCA *40*, 761 (1957).

A STUDY of the factors influencing the viscosity of alkyd resins by Reynolds and Gebhart indicates no simple relationship between solvent and resin. With long oil alkyds the solvent viscosity is more indicative of viscosity reducing power than aniline cloud point, Kauri-butanol value or solubility parameter, and a linear relationship is found at low concentrations. Equations based on Huggins' relationships have been derived. Very long oil alkyds behave like spherical particles suspended in a solvent and obey the Burgers-Saito equation. At concentrations above 30g./100 ml. solvent power becomes important. Short oil alkyds are predominantly dependent on solvent power and are highly aggregated in poor solvents, and hydrocarbon type is very important at high concentrations where a greater tendency to aggregate exists. OD *29*, 1174 (1957).

THE THERMAL decomposition of ethylene glycol acid phthalate indicates no acidolysis, but occurs by cleavage of phthalic anhydride. The results are applied to alkyds. CA *51*, 3510 (1957).

ODORLESS alkyds have been considered by Tremain, who attributed an unpleasantness of odor during drying to the production of aldehydes. More of these low molecular weight compounds are released from the more highly unsaturated acids, and soya modified alkyds show the best compromise between drying and low odor level. A cottonseed alkyd is suggested for radiators, as the heat aids the drying, and a medium tall oil (low rosin) vehicle exhibited a low odor level. By passing air over

d ing films into a permanganate s ition, the amount of aldehydes re ased was determined. While a inseed alkyd produced a higher p portion of aldehyde initially, o r a period of a week the same t l amount was released by a si ilar soy alkyd; a measurable a ount is still produced at the end o seven days. JOCCA *40*, 737 (1957).

Composition Variations

VARIOUS tall oils, adjusted with soy acids or rosin to a constant composition, were converted into three series of alkyds of either equal viscosity, equal acid value, or both (varied phthalic content) by Bitting, *et al.* The clear vehicles (33% rosin) made from acid refined and distilled tall oils had outdoor durability equal to alkyds from synthetic mixtures. The high viscosity tall oils containing a high proportion of dimerized materials less resistant to water had poor durability. OD *29*,170 (1957).

ISOPHTHALIC alkyd oils (less than Z-6 viscosity, solid) are more viscous and body more rapidly than their phthalic counterparts, but are less viscous than maleic oils. While phthalic oils darken and show decreasing dry on heat bodying, isophthalic oils retain their color and improve in their drying properties, as a tendency to after tack is lessened. Carlston and Lum state that they are resistant to cracking and checking on wood, and that highest mildew resistance is obtained from the high viscosity oils made by heat bodying or increased isophthalic content. IEC *49*, 1051 (1957).

TOMS prepared alkyds from Δ-4-endomethylene tetrahydrophthalic anhydride, but found the resins too hard and brittle for drying alkyd use. Total substitution for phthalic is possible in non drying plasticizing alkyds for nitrocellulose. Chem. Prumysl *7*, 276 (1957).

IORT and Raison report that a ax which cannot be removed from nseed oil by treatment with caron nor by refrigeration and filtraon carries through alkyd processg and can increase the diffuse reection up to 10%, decreasing the oss. The phenomenon occurs ore frequently in warm weather an in cold and is caused by 0.01-02% of a colloidally dispersed tty alcohol-fatty acid ester of 5-30 micron size from the flaxseed coating. The particles project through the surface of the film like an undispersed pigment and show no wetting action. JOCCA *40*, 24 (1957).

ALKYDS made from 1,2,6-hexanetriol have lower viscosity and are slower drying than glycerol alkyds, but show excellent impact resistance, color, and retention of flexibility. Tess, Harline and Mika compared resins at constant phthalic content and at equivalent polyol replacements. The esterification rate of the hexanetriol at 230°C. is comparable to that of glycerine at 250°C. Above 230°C. the resins reach a minimum acid value and then increase; the attainable minimum is lower at lower temperatures. A better dry is found with resins prepared at 230°C. IEC *49*,374 (1957). MULLER examined the behavior of pentaerythritol in alkyd preparation. The ash content, especially when it is CaO, accelerates alcoholysis but also leads (through side reactions) to discoloration. The relative effects of PbO and KOH on color and clarity of the final alkyds are noted. Fette, Seifen, Anstrich. *58*,839 (1956).

PENTAERYTHRITOL — ethylene glycol combinations in long and medium oil alkyds were reported on by Landig, *et al.* One series was made by using maleic anhydride to attain a constant acid value and viscosity as the glycol increased, another decreased the amount of fatty acid, while a third series kept the acids constant and allowed the viscosity to vary. Maleic modification allows the use of a 77/23 ratio before a deficiency in dry is noted, although lower ratios can be used if the drier content is raised. Although the combinations dried as well as a straight pentaerythritol alkyd, the resins were softer. At high viscosity or low fatty acid content, oil compatibility was poor. Good compatibility with vinyls is achieved with low viscosity, high hydroxyl resins with little or no maleic content and higher proportions of glycol. PE-glycol resins are more compatible with chlorinated rubber than straight pentaerythritol or glycerol alkyds. Water resistance was good except for slow drying or low viscosity resins. Moderate amounts of glycol do not affect the exterior durability of enamels. OD *29*, 453 (1957).

KRAFT suggests the use of a constant phthalic/polyol ratio in evaluating alkyds as more suitable than the equal oil length or equal phthalic content approach. More consistent results for a series of trifunctional alkyds are obtained with regard to dry time and viscosity by this method, indicating a similarity in the gross resin structure when a molar concept is used. Gelation curves are presented for different molar ratios of polyol/phthalic content with varying amounts of fatty acids, and a comparison of glycerol, trimethylol ethane and trimethylol propane resins is given at several levels of excess hydroxyl content. Typical caluations for alkyds on several bases are given in detail. OD *29*, 781 (1957).

SOMERVILLE compared glycerine alkyds to those made with other polyols, relating functionality considerations and the influence of the secondary hydroxyl group. PIM *72*, #2, 22 (1957).

ALKYDS made from conjugated (15-20%) soy polyunsaturated acids are equivalent to those made from dehydrated castor acids. J. Japan Oil Chem. Soc. *5*,236 (1956).

KAMALA seed oil is unsuitable for the preparation of long oil alkyds because of the high rate of polymerization. Kamala modified alkyds are harder and more water or solvent resistant than linseed, tung, or castor modified alkyds. Sharma and Aggarwal report that baked films had good flexibility and adhesion, but usually formed wrinkle finishes. J. Sci. Ind. Research *15B*,608 (1956). Helm and Molines followed the treatment of linseed oil through neutralization, decolorization, oxidation and polymerization via infrared and found trans isomers only in the polymerized material, indicating that isomerization occurs during polymerization and facilitates the reaction. Alkyds made with isomerized acids reach a given stage more rapidly or at lower temperatures. Maleic condensations and soybean oil polymerization are also enhanced by preliminary isomerization. Rev. franc corps gras *4*,189 (1957).

INFRARED studies by Smith, *et al*, of the thermal degradation of alkyds indicate the isomers of phthalic acid to have the following ratio of stability: ortho-1, iso-60, tere-100. On the same scale, a silicone resin would be 21,000. IEC *49*, 1903 (1957).

STABLE water dispersions of alkyd resins have been described by Armitage and Trace. By using polyethylene glycol as a modifying polyol, emulsions of 0.5-1 micron particle size were made. The lower molecular weight polyethylene glycols (200-400) produced easily emulsified resins and stable emulsions. The number of ether groups should be high and the resin viscosity low, but a relatively narrow range of compositions are available to yield stable emulsions which leave no tack on drying. Amphipathic solvents aid in producing lower particle size and greater emulsion stability. Washable high gloss enamels with good durability are claimed from the process. JOCCA *49*, 849 (1957).

KRAFT, Metz and Roberts studied the processing of pentaerythritol alkyd. Optimum conditions for alcoholysis (fastest rate, lowest color, freedom from dehydration, least haze in alkyd) are attained with the following oil-catalyst combinations: linseed, coconut—0.03% lithium hydroxide based on oil; soy, dehydrated castor, safflower—0.01% litharge. Calcium oxide leads to dehydration and haziness. The rate of dehydration decreases in the series dehydrated castor > linseed > safflower = soy = coconut. Alcoholysis rate decreases as the oil length decreases from 80 to 62, but an increase at 56% oil was noted. Adding 20% water to the alcoholysis charge improves the color. Low alcoholysis temperatures increase the time of reaction but decrease the filtration time, but low esterification temperatures increase filtration time. The longer an alcoholysis reaction is held at temperature, the shorter the filtration time of the final alkyd but the color and acid value (at equal viscosity) is increased. A reflux condenser during alcoholysis reversed these effects. Increasing the flow of inert gas decreases filtration time but increases the acid value of the alkyd. The best color is attained by adding the alcoholysis ingredients before heat is applied to the kettle. PVP *47*, #8, 29 (1957); Chem. in Canada *9*, #7, 48 (1957).

Preparation

SVOBODA and Mares have calculated the probability of occurrence of partial esters from fatty acids and polyalcohols. The ratios of the individual esters are derived from the polynomial $(A+B)^n$ where n equals the valence of the alcohol and A and B are the mole percentages of reactants. Chem. Tech. *8*,599 (1956). KLAUSCH followed the formation of acid anhydrides in polyesters by titration in an alcoholic medium where the anhydride is effectively monocarboxylic. Anhydride formation is significant in the latter stages of the esterification of phthalic acid with glycerol at 200°C. and is not eliminated by excess polyol or sodium hydroxide. None occurs with isophthalic-glycerine or phthalic-triethylene glycol combinations. FL *63*,119 (1957).

KRAFT, *et al*, report on the preparation of alkyds in a two stage reaction whereby only part of the monovalent acids are present in the initial esterification. A high viscosity, light colored product with better dry, flexibility, adhesion, and alkali resistance is claimed. Preliminary fractionation data indicate a higher amount of less soluble polymer is formed than by conventional means. APJ *41*, #28,-96 (1957); PIM *72*,#4,8 (1957).

Vinyl Modifications

ACRYLONITRILE modified styrenated alkyds are claimed to have unusual solvent resistance, hardness, and mar resistance. USP 2,748,092. PETROPOULOS, *et al*, report that increasing the amount of acrylonitrile in a formulation increases the viscosity and improves the mineral spirits resistance. The latter is better with linseed oil than with tall oil alkyds, and styrene polymers are better than methyl styrene in this respect. Acrylonitrile is said to promote the co-reaction of alkyds with styrene. An unexplained increase in dry time was found with low acrylonitrile formulations. IEC *49*,379 (1957).

BEVAN, *et al*, prepared a series of alkyds modified with styrene or vinyl toluene. Haziness in thick films was eliminated at a concentration of about 4 x 10^4 conjugated groups per gram of fatty acid. Less oxygen is absorbed by styrenated alkyds than can be accounted for by dilution of the oxidizable components. The amount of extractable material after drying increases as the degree of modification increases and is greater for styrenated alkyds. Modified alkyds take longer to approach their ultimate hardness, and a tobacco seed—DCO alkyd was harder than a linseed-tung modified resin. A maximum interval between set to touch and tack free times is found at hydrocarbon modifications of 20-30%. JOCCA *40*, 745 (1957).

Epoxy Modifications

GEL free resins from the coesterification of dihydric alcohols, dibasic acids, fatty acids and epoxy resins yield tough, flexible, mar resistant baked finishes according to BP 762,764. PEARCE and Kawa epoxidized polyesters of tetrahydro phthalic anhydride and unsaturated alkyds with an anhydrous ion exchange resin catalyst at low temperatures. Ten or more epoxy groups per mole can be obtained and the resin can be regenerated for further use. JAOCS *34*,57 (1957).

Miscellaneous

VINYL chloride polymers, when dispersed to an 8-10 micron size in about five parts of an alkyd resin, yield hard, durable wrinkle finishes of fine uniform texture. Above this ratio, the texture becomes microscopic and the finish appears dull. BP 734,664.

RECENT advances in alkyds were summarized by James. PM *27*, 401 (1957).

CELLULOSICS

A SYMPOSIUM on cellulose derivatives included the following topics (IEC *49*,68 (1957)):

1) Cellulose thiourethanes
2) Phthalic acid esters of cellulose, which yield water soluble salts.
3) Far hydrolyzed cellulose acetates with less than 32% acetyl content. Water soluble products yielding films of high water permeability

the ADM kaleidoscope

Published by
Archer-Daniels-Midland company

New Products: Will Yours Catch Fire or Fizzle?

By J. C. Konen,
Vice President and Research Director

Everyone in the paint business feels the relentless pressure for new products. Most of us have seen the results, too . . . unproven products pushed on the market, a confusing and growing list of new developments to evaluate, rapid changes which upset previous plans.

Many paint manufacturers tell us that it is becoming increasingly difficult for them to know what to do. They know that the pay-off for a successful new product is often spectacular—but don't want to jeopardize a hard-won reputation by scrambling for a brief merchandising advantage.

If you are uncertain about what to get into, what to watch and test, what to ignore, one solution is to follow the guidance which ADM provides. ADM's experience shows that every step in new product research takes time and careful testing. There are no shortcuts, no overnight miracles.

ADM experience proves, for example, that any new paint product needs a minimum of two to three years exposure experience—and four to five years is even safer. There's no substitute for properly run exposure tests. Even accelerated testing in weather-ometers or on 45° panels isn't completely reliable.

Experience also shows that *where* the tests are conducted can be as important as *how*. A product that looks good after exposure tests in Chicago may not look nearly as exciting after tests in Miami or Newark. So testing long enough in a variety of locations is important, too.

Only a superbly equipped, experienced research staff can begin to cope with the wide variety of problems which plague new product research efforts. Crawford H. Greenewalt, chairman of the board of duPont, put it this way: "Research is the product of patient men and patient money."

This has been the ADM approach to new product research. It is why you can rely on ADM leadership to provide you with the sort of new products on which solid sales success can be built.

You can rely, too, on the new Resin Finder for Exterior House Paints which appears on the next two pages. It has been put together to help you simplify your formulating and inventory problems by giving you a basic list of versatile, proven vehicles from which you can produce a wide range of exterior paint products.

It will help you to take advantage of new developments . . . while still keeping inventories to workable, sensible, economical levels.

ADM RESIN FINDE f

BLISTER RESISTANT HOUSE PAINTS

	Special Features	Application Properties	Durability	Versatility
Aroplaz 1271	Outstanding adhesion under adverse moisture conditions. Maximum durability. Fade resistance comparable to best tint-retentive linseed house paints.	Good. Up to 25% modification with Aroflat 3025 eliminates wrinkling problems and further improves brushability. Aroplaz 1254 and Aroplaz 1241 may also be used, at the same percent modification, to eliminate wrinkling.	Outstanding durability, especially on poorer woods such as southern yellow pine. Far superior to conventional house paints in this respect. Not recommended where mildew is a problem.	Use to upgrade conventional house paints by substituting for part or all of the bodied oil. Increases vehicle solids and improves application properties of alkyd trim paints. Performs well in virtually all exterior applications.
Var 70 Admerol 75-M	Perform well over new wood and when repainted over themselves. Not recommended for repaint over conventional zinc-containing house paints. More economical but less tint retentive than Aroplaz 1271.	Very good. Equal to or better in brushability than linseed oil house paints. Proper selection of solvents and driers gives good wet edge properties.	Comparable to good linseed house paint, if used on new wood.	Widely used in aluminum paints, barn paints, and as a modifier for limed oils in interior applications. Also used in floor varnishes and sealers. Recommended for Federal Specifications TT-V-71d, TT-V-121C and Maple Floor Manufacturers specifications.

FLAT ALKYD SHAKE AND SHINGLE PAINTS

Aroflat 3025	Good color uniformity over surfaces of varying porosity. Outstanding viscosity stability with temperature changes and with tube color additions.	Excellent brushing, sag-resistance and wet-edge characteristics. Non-penetrating properties permit easy application on porous surfaces.	1 ½ year exposures indicate very good durability and tint retention on shake shingles. Flat alkyds not recommended for wood siding due to cracking tendencies.	Excellent zinc oxide compatibility makes possible maximum mildew resistance. Also has wide variety of interior uses such as flats, semi-glosses, glosses and primer-sealers.

TRIM PAINTS

Aroplaz 1241 Aroplaz 1254	The most generally used type of long oil alkyds for highest quality trim paints.	Fair to good as sole vehicle. May be improved by modification with Aroplaz 1271, a very long linseed alkyd.	Very good durability, fade resistance and gloss retention. Where mildew is a problem, linseed based Aroplaz 1244 is recommended as an alternative.	Recommended for high quality glosses, semi-glosses, undercoats, metal primers, sign enamels and industrial maintenance finishes.
Var 70 Admerol 75-M	Copolymers for economy, positive dry and versatility.	Very good. Better than alkyd vehicles.	Good durability, but fade resistance and gloss retention not equal to alkyds.	Refer to Stain and Blister Resistant House Paints for information on versatility.

for Exterior Finishes

PORCH AND DECK PAINTS

	Special Features	Application Properties	Durability	Versatility
Aroplaz 2475	Positive overnight dry. Very good abrasion and water resistance.	Good.	Outstanding durability, fade resistance and gloss retention.	A premium quality resin for trim enamels, traffic paints and general maintenance finishes.
Aroplaz 1241 Aroplaz 1254	Generally accepted as the standard for alkyds in this application.	Good.	Very good durability, fade-resistance and gloss retention.	Refer to Trim Paints for information on versatility.
Admerol 351	Modifier for alkyds to improve dry, hardness and resistance to abrasion, water and alkali. Var 70 and Admerol 75-M, alone or in blends with Admerol 351, are used as modifiers for alkyds in the same way.			

CONVENTIONAL HOUSE PAINTS

Archer 371 Archer 381	Blended linseed oil that replaces bodied and limpid combinations. Specially processed for optimum durability and minimum zinc reactivity. 381 offers greater economy but is somewhat poorer in color. Use in tint bases.	When used as we recommend, has a balanced blend of very good brushability, flow and sag-resistance. Optimum flow properties for less ropyness, more uniform film thickness and maximum durability.	Very good. Represents the highest standard of quality for conventional linseed oil house paints.	Widest range of uses for exterior surfaces of any paint category. Used as major portion of vehicle in Federal Specifications TT-P-102, TT-P-103 and TT-P-104.
Archer 360	For one-coat house paints. Highest gloss and maximum flow. Specially processed for better wetting and grinding than 371 and 381 for excellent gloss and gloss retention at higher PVC.	Very good. Similar to Archer 371 and 381 in application properties.	Very similar to 371 and 381.	Improves grind flow and gloss when used in any type of linseed oil house paint.
Ardol G-H	Chemically modified soybean oil. More versatile than 371 and 381 and with less yellowing. A partial or total replacement for linseed oil in any type of exterior finish.	Comparable to Archer 371 and 381.	Comparable to Archer 371 and 381.	For extending alkyd interior and exterior enamels. A good kettle oil for varnishes.

HOUSE PAINT PRIMERS

Linogel Soyagel Ar anco V-160 A nco Series C KO Series	Any of these vehicles, used in combination with the above, or raw or refined linseed oil impart non-penetration and improved ease of application to prime coats over new wood. Also use for special effects, such as increased flow, better brushability, ease of grinding, thixotropic puff in conventional gloss house paints.

Many of you know Bill Gove. He's been on our Northwoods Paint Sales Workshop Program three years in a row and has been a featured speaker at many trade conventions.

In 1953 The National Sales Executives picked him "Salesman of the Year" and the St. Paul Advertising Club in 1954 named him "Sales Promotion Man of the Year."

Bill will present, via KALEIDOSCOPE, his "Easy to Buy From" series.

Bill's a pretty practical guy. He believes that if we become easier to live with—we just automatically become easier to buy from.

"Easy to buy from"

By Bill Gove

WHAT DOES IT TAKE TO BE A STAR PERFORMER?

Fred Haney, manager of the Milwaukee Braves, was talking about his great second baseman, "Red" Schoendienst.

"Red," said Haney, "does everything well. He hustles every minute, gets his hits when they count the most, and always comes up with a big defensive gem when things look darkest."

"Yes," he continued, "Red does everything you ask him to do—AND THEN SOME!"

It occurs to me, as I know it must occur to you, that the key to the above appraisal is in the words—AND THEN SOME.

If you read the sports pages, you know that Schoendienst's value to the team goes far beyond hitting and fielding. Sure, his average almost always hangs over the .300 mark, and he makes the double play as well as anyone in the business. But he does other things that make the big difference.

He has a settling influence on the younger players in the club. He has the uncanny knack of being able to diagnose the opposing team's strategy. He works with rookies—helps 'em develop.

He was hired to run, hit and field—this he gets paid for. And when Milwaukee won the pennant, the experts gave the big bouquet to "The Redhead."

Because, like his manager says—"he does everything —AND THEN SOME!"

Seems to me there's something for all of us to think about here.

The *average* salesman does everything expected of him. He covers his territory regularly—serves his customers—keeps orderly records.

But the professional salesman does all these things—AND THEN SOME. He is alert to change. He's always looking for new ideas to pass on to his customers—ideas that will help them do more business.

AND THEN SOME—how often we see this philosophy dramatized in so many great success stories!

One great wholesaler I know once said, "Bill, always remember this. Any fourteen-year-old kid can take a catalog, quote prices, and fill up an order pad with stuff a customer needs. But if you want to call yourself a salesmen, *give a little extra!* A little extra to the company, with more calls. A little extra to the consumer, with more advice. It's that 'little extra' that really separates the men from the boys."

AND THEN SOME—an attitude that will *make you easy to buy from* . . . Just try it and see!

and water insolubility can be obtained. The resins can be crosslinked with glyoxal or aqueous triethanolamine at room temperature.

4) The rheology of sodium carboxymethylcellulose solutions can be explained by the entrapment of soluble polymer in gel centers of poorly soluble crystalline material. The aggregation and dispersion of these centers account for the properties of the solutions, as the gel strength is dependent on the previous shear history; a low shear leads to a gel of low strength.

5) Temperature-viscosity relationships of methyl cellulose. The solubility is dependent on the uniform distribution of low substituted units, while the gelation varies with di- or tri-substitution. Low temperature viscosity is increased by residual crystalline components, while high temperature viscosity is caused by aggregation or crystallization of highly substituted units.

MOORE presents osmotic pressure measurements of cellulose derivatives to determine free energy parameters in various solvents. The amount of hexane needed to precipitate a polymer from a solvent is not a measure of the solvating power of the solvent for a cellulosic, but the decreasing parameter in a homologous series is consistent with the precipitation of solvated polymer. The constant parameters with non-polar solvents indicates a separation of unsolvated polymer. Viscosity parameters in general are discussed, and the solvation and chain stiffness of polymer chains are used to interpret the properties of dilute polymer solutions. PVP *47*,#2,40 (1957).

JULLANDER describes the manufacture of a water soluble ethyl hydroxyethylcellulose in Sweden and compares it to methylcellulose. The product is useful as an emulsifier in latex paints, and its solubility, viscosity, and stability with salts is reviewed. IEC *49*,364 (1957).

A PURIFIED hydroxyethyl cellulose has been found to have an almost homogeneous condensation between the alkali cellulose and the ethylene oxide, but three commercial products of the same approximate composition contained non-carbohydrate polyethylene glycols Can. J. Chem. *35*, 677 (1957).

THE SPRAY drying of an ethylcellulose-water emulsion which may include plasticizers or pigments leads to small particles of low density. Hydrosols, organosols, or plastisols can be prepared from them, and coatings from the fused films are claimed in fast baking compositions. BP 734,414. CELLULOSE derivatives can be prepared in dispersion by running a solution and emulsifier into an immiscible non-solvent which boils higher than the solvent. Finely divided cellulose acetate, ethylcellulose, and nitrocellulose dispersions of uniform five micron size are claimed in BP 734,547.

ENGELMANN and Exner prepared cellulose tricrotonate and acetocrotonate. The products may be crosslinked by heat, light and peroxides. Makromol. Chem. *23*, 233 (1957). FILM formers can be made by treating cellulose acetate with phthalic anhydride in pyridine, but with increasing phthalic content the heat stability decreases. CA *51*, 6144 (1957).

TRACER methods have shown that the residual sulfur in nitrocellulose is not held by adsorption as the sulfate, but is present within the fibrous structure. Can. J. Chem. *35*, 704 (1957).

THE ACETYL content of cellulose acetate can be measured by the near infrared absorbance in a pyrrole solution. AC *29*, 499 (1957).

THE INITIAL action of low energy light on nitrocellulose films is the formation of an activated complex which then yellows. The color bodies are then irreversibly bleached and degraded by light of less than 3600 Angstroms. Degradation can therefore occur by the action of light alone, although the rate controlling step can take place in the dark. PVP *47*, #13, 42 (1957). FREEBORNE points out that light is important in bloom formation on lacquers. It catalyzes the chemisorption of chemicals in the atmosphere to retain condensed moisture. PM *27*, 267 (1957).

MICHAEL and McQuaig tested dibasic esters of dimethyl cyclohexanol in lacquer formulations. The phthalate especially was found suitable where adhesion, light and weather resistance are factors. Can P.V. Mag. *31*, #6, 34 (1957).

DIMETHYLCYCLOHEXYL phthalate, tricyclohexyl citrate, cyclohexyl p-toluene sulfonamide and di-isobutyl tartrate have been compared as plasticizers for nitrocellulose, in combination with castor oil derivatives. None is an efficient plasticizer, but Kraus reports that films with the first two compounds had high alkali resistance. F.L. *63*, 347, 394 (1957).

EPOXYS

Epoxidized Compounds

GALL and Greenspan have reviewed recent advances in *in situ* epoxidations with resin catalysts. A continuous flow apparatus which reduces resin fragilation and degradation and an expendable resin process using small amounts of catalyst is described. JAOCS *34*,161 (1957).

CHATFIELD surveys the uses of epoxidized oils in surface coatings, including the thermal stabilization of vinyl chloride polymers, reaction with fatty acids to yield branched chain drying oils, reduction of acidity of varnish media, control of gassing of aluminum paints, and the mechanism of their anti-corrosive action in varnishes. PM *27*,#2,51 (1957). DANZIG, *et al*, prepared various estaersof conjugated trans, trans soy acids and their adducts, which were then epoxidized and compounded with vinyl chloride. JAOCS *34*,136 (1957). SILBERT and Port used epoxidized fatty acid esters as both internal and external plasticizers for vinyl acetate. Copolymers of vinyl epoxy stearate serve as potentially cross linkable resins, yielding clear hard films which can react with acids. This may stabilize vinyl acetate emulsions against hydrolysis and inhibit corrosion. JAOCS *34*,9 (1957).

SWERN and Parker find that linolenic acid is 65% epoxidized by peracetic acid in acetic acid solution. Kinetic runs with perpelargonic acid show that two of the three double bonds are epoxidized. J. Org. Chem. *22*, 583 (1957). THE kinetics of epoxidation were followed polarigraphically by Ricciuti, *et al.* JAOCS *34*, 134 (1957).

FITZGERALD, *et al* described a liquid butadiene which was epoxidized with peracetic acid in chloroform. The product was cured with polyamines and polybasic anhydrides to yield films of good flexibility and electrical properties. MP *34*, #27, 212 (1957).

HIGHLY reactive soluble epoxy resins are produced by styrenating oil insoluble novolaks and etherifying with a haloepoxyalkane. BP 774, 582; 774, 583; 774, 584.

Epoxy Resins

EPOXYS and urea-epoxy combinations have been compared to vitreous enamels for heating appliances. Millar found that the epoxys were superior in chip resistance, but inferior in abrasion, scratch, heat, water, or acid resistance, and yellowed more. Some epoxys were superior to glass against hot alkali but others were inferior. JOCCA *40*,478 (1957). GLASER, Floyd and Wittcoff studied polyamide-epoxy coatings. Increasing the epoxy content improves hardness and solvent resistance, while increasing the polyamide increases flexibility, adhesion and weathering resistance. Pigments should be ground in the polyamide because of the good wetting, but zinc chromate reacts slowly with the resin. The combination has a pot life of 4-5 days, and although coatings can be handled within minutes they take several days to fully cure at room temperature. They yellow slightly but show good color retention. While chalking on exposure, the chalk is claimed to wash away to the original gloss. OD, *29*,159 (1957).

EPOXYS have been combined with masked isocyanates to yield flexible chemical, moisture, and heat resistant coatings for copper or aluminum wire. BP 763,347.

RESOLS and novolaks have been condensed with epichlorohydrin to form molecules containing several epoxy groups. Ivinson, *et al*, report that crosslinked resins from these compounds are more rigid than conventional epoxy resins. The effect of amines on the gelation was studied. J. Appl. Chem. *7*, (3), 118 (1957).

CROSS-LINKABLE acrylonitrile —acrylate copolymers containing epoxy groups are described in USP 2,787,561. ALLYL glycidyl ether has been copolymerized with vinyl acetate. USP 2,788,339.

EPOXY RESIN ethers from polyglycidyl ethers and long chain alcohols have been described. German P. 948,358.

PARK and Blount reported that the rate of oxidation of acid cured epoxy resins is independent of the length of air dry before subjecting to heat. At bake temperatures above 205°C., a slow volatilization of the coating occurs and a chemical change enhances the oxidizability of the film. Unreacted epoxy groups are the focal points for oxidative attack. The oxidation rate is independent of film thickness above one mil. Films in high temperature service increase in density. IEC *49*, 1897 (1957).

GAS checking in epoxy-urea combinations increases on aging of the solution and decreases with higher amounts of urea resin. Swift and Stolton designed a standardized apparatus for the inducement of gas checking and report that 10% methyl cyclohexanone inhibits the effect and that an optimum flash off time before baking is found. Too much ketone reduced the gloss. High melting epoxys did not gas check. Basic or anti-oxidant additives are not useful, but acidic reagents prevent checking although they lead to short pot life. The morpholine salt of toluene sulfonic acid is recommended for a curing agent; it inhibits checking and results in stable solutions. Combinations of antioxidants with acids or bases prevented checking of epoxy ester—melamine combinations. Little checking has been found in epoxy-non drying alkyd-melamine or epoxy-phenolic systems. OD *29*, 664 (1957).

FILMS which cure by simultaneous esterification and olefin polymerization are described by Greenlee, *et al.* Polyesters of tetrahydrophthalic anhydride or polybutadiene polymers were epoxidized with hydrogen peroxide and an ion exchange resin. The polyepoxides were mixed with organic acids and films were baked at low temperatures. The butadiene polymer contained enough residual unsaturation to allow the use of saturated fatty acids. Standard epoxy resins can also be cured when dimeric or trimeric fatty acids are used. Low viscosity products using polymerization sensitive acids (such as tung) can be formulated by the technique, which avoids the high temperature varnish cooking step. IEC *49*, 1085 (1957).

Epoxy Esters

FIVE composition terminologies were proposed by Earhart and Montague to establish a common language for the discussion of epoxy resin esters. Calculation of the theoretical composition of the esters ignoring any epoxyhydroxy side reaction is experimentally shown to be sufficiently accurate over the practical ester composition ranges. IEC *49*, 1095 (1957).

DUNBAR and Dante described epoxy resin esters with rosin containing materials and *in situ* varnishes. APJ *41*, #50, 96 (1957).

GOLDBLATT, *et al*, prepared epoxy esters with tung oil fatty acids. The more conjugated acids esterify more slowly than less highly conjugated acids. Zinc resinate catalyzes the esterification, and a two stage reaction sequence was found useful. Half of the fatty acids are initially esterified to a low acid value and then the remaining fatty acids, including all the tung acids, are added. The second stage can also be carried out using methyl esters of tung oil and an alcoholysis catalyst to produce vehicles with an acid value below one. About half of the conjugated triene is retained in the ester. A narrow range of optimum drier content occurs. IEC *49*, 1099 (1957).

SOMERVILLE and Herr made epoxy resin modified alkyds by first reducing the functionality of the epoxy resin with monobasic acids before adding the remaining usual alkyd ingredients. Desirable properties of both the alkyd and epoxy resin are retained in one composite vehicle, showing de-

tergent resistance and non-discoloration on overbake or ultraviolet exposure. IEC *49*, 1080 (1957).

Resin Formation and Curing

O'NEILL and Cole followed epoxy resins reactions chemically and spectroscopically. Most of the epoxy groups react within three hours in an ethylene diamine curing system, but the main build up of insoluble resin occurs later. With polyamide systems, initial loss of epoxy groups is slower and resin formation more closely follows the decrease in epoxy content. In early stages of polymerization, polyamide cured films are softer, despite the greater amount of cross-linking. J. Appl. Chem. *6*,356 (1956). EPSTEIN presented a mathematical method for determining the amount of amine curing agents for an epoxy resin. Plastics Tech. *2*,739 (1956). FISCH, *et al*, showed that in the phthalic acid curing of epoxys, a strongly temperature dependent equilibrium is set up (after reaction of epoxy groups) between phthalic, monoester, and hydroxyl groups. When cured resins are heated, most of the monoester groups are split off and phthalic anhydride is evolved. A minimum point occurs in the graph relating weight loss and amount of catalyst used. J. Appl. Chem. *6*,429 (1956).

A SIMPLE technique for studying the cross-linking of epoxys is to cure the film between potassium bromide pellets made in a standard infrared press and then measure the absorbance at various stages of cure. JPS *25*, 351 (1957) PEERMAN, *et al*, followed the curing of polyamide-epoxy resin blends. A temperature of 300°F. gave the most rapid cure, and no detectable oxirane oxygen remained, although amine cured resins invariably retained some residual epoxy at this temperature. Heat distortion is more clearly associated with degree of cure than flexural or compressive strength, or hardness. IEC *49*, 1091 (1957).

FEILD and Robinson state that pyromellitic dianhydride cured epoxys have good retention of physical strength at or above their heat distortion temperature. The catalyst solubility is increased by fluxing with phthalic or maleic anhydrides. The resin properties are attributed to the compactness of the anhydride. IEC *49*,369 (1957). ACIDIC polyesters with 0.8-1.2 acid groups per epoxy have been used to cure epoxys. The blends may contain as much as 70% polyester. BP 732,253.

PITT and Paul evaluated N-hydroxyalkyl polyamines as curing agents for epoxy resins. These low toxicity compounds are less effective than acid catalysts but the slower curing catalysts improve the chemical resistance. Mod. Plastics *34*, #12, 125 (1957). ALLEN and Hunter described several modified aliphatic polyamines used as catalysts for epoxys, including low viscosity acrylonitrile derivatives and low toxicity, fast setting ethylene oxide condensates. J. Appl. Chem. *7*, #2, 86 (1957). A MIXTURE of triethylene tetramine and triethanolamine is claimed to cure epoxy resins faster than either compound alone. USP 2,783,214. POLYVALENT metal alcoholates can be used to harden epoxy resins. USP 2,767,158.

BY ADSORBING boron trifluoride complexes on finely divided solids and coating the particles with wax, Wagner realized a controlled release of the very efficient catalyst into a liquid epoxy resin. A smooth, rapid reaction occurred which was essentially complete with several minutes. JPS *26*, 329 (1957).

THE REACTION of phenolic hydroxyls with epoxy groups requires at least 140° for 24 hours to be complete. Bruin reports little reaction between methylol groups and the hydroxyl of the epoxide resin. With butylated resols having few methylol groups, products lack solvent resistance, but if too many free methylol groups are present, much intracondensation occurs, resulting in a brittle product. PPV *33*, 622 (1957).

HALOGENATED RESINS

Chlorinated

CHLORINATED rubber can be used to upgrade drying oils when cut in for an hour at 110-120°C. Solubility and viscosity data indicate the following order of solution power: linseed > fish > soy > dehydrated castor > tung oil. Wit[h] linseed oil and a high shear ag[i]tator or a ball mill, no heat is nec[]essary to dissolve 5 cps. Parlo[n]. The final reduction of the vehic[le] should be at room temperatur[e]. Enamels dried in 24 hours and ha[d] good alkali resistance. PVP *47* #1,35 (1957).

DISPERSIONS of chlorinated rub[]ber in low powered solvents can b[e] prepared by slowly adding a var[]nish to a solution of the rubbe[r] in a higher boiling aromatic sol[]vent. Non settling precipitates o[f] 0.1 micron size are generated. Coatings from these dispersion[s] are clear because the chlorinate[d] rubber particles dissolve during th[e] latter stages of drying. USP 2,793,056.

SMOOK, *et al*, discussed the preparation, solubility, stability, curing and mechanical properties of chloro-sulphonated polyethylene. Pigmentation and additives to improve film formation and adhesion of the elastomer in anticorrosive coating formulations are noted. Chem. in Canada *8*,#10,54 (1956).

HYPALON can be cured by a combination of metal oxide, organic acid, and sulfur containing accelerator. POCR *120*, #13, 10 (1957).

VINYLIDENE chloride resin experiences in chemical resistant coatings are summarized in Corrosion *13*,#3,81 (1957). PHYSICAL properties, chemical resistance, toxicity, shipping and application properties are given. Aqueous vinylidene chloride dispersions are rendered non-corrosive to chromium and other metals at elevated temperatures by the incorporation of small amounts of hydrogen peroxide. USP 2,744,080.

CANTERINO chlorinated polybutadiene and compared the product to chlorinated rubber. The synthetic product has a higher tensile strength, greater acid and alkali resistance and better solubility. Partially chlorinated butadiene-styrene copolymers yield rubberlike products which can be vulcanized IEC *49*, 712 (1957).

HALOGENATED polymers can be cross-linked with polyamine precursors. The products are film formers. BP 772,522.

CHLORINATED rubber based

paints were discussed by Parker. PM *27, 333* (1957).

Fluorinated

ALLAN studied contact angles of aqueous alcohol on polytetrafluoroethylene after various prebonding treatments to determine the wettability and friction characteristics. A treatment which yields good adhesion produces a marked increase in the polarity of the surface. The treated side has a considerably higher friction. JPS *24*,461 (1957).

THE ADDITION of oily or waxy chlorotrifluoroethylene polymers to dispersions of high molecular weight resins of the same composition in ketone-aromatic systems yields coatings which can be fused at moderate temperatures. USP 2,-775,569.

SCHWEIKER and Robitschek found that transesterification was not suitable for the preparation of polyesters from fluorinated diols and that direct esterification was too slow, so acyl chlorides were used to prepare resins with molecular weights above 15,000. Resins made from sulfur containing diacids were similar in solubility to their carbon counterparts, as the presence of fluorine alone decreases the solubility besides raising the brittle temperature. Either rubbery gums or waxy solids can be prepared. JPS *24*,33 (1957). SIMPLE Esters of $H(CF_2)_nCH_2OH$ or $F(CF_2)_nCH_2OH$ can be prepared by direct esterification with acid catalysts and are stable towards oxidation, hydrolysis and pyrolysis. IEC *49*,189 (1957).

THE USE of fluorocarbons in protective coatings was discussed by Bartczak. PIM *72*, #5, 22; #6, 22 (1957).

HYDROCARBON RESINS

SHOTTON and Wolfe described the use of liquid polybutadiene in surface coatings. The resin can be air dried in eight hours (although it increases in hardness on aging) or can be baked at 375-425°F. for 5-15 minutes to yield solvent and chemical resistant films, although the adhesion is ruined in salt spray. Compatibility tests show an unpredictable pattern. Can coating tests with dog food are compared to R and C enamels. The resin can be heat bodied or copolymerized with oils, and has a residual unsaturation which can be halogenated, epoxidized or maleated. PVP *47*,#1,31 (1957), APJ 41. #19, 78 (1957.) HYDROXYLATED polybutadiene has been reacted with dibasic acids and fatty acids to yield quick drying printing ink vehicles. USP 2,778,806.

BLANCHETEAU summarized an eighteen year exposure of a steel arch coated with several layers of bituminous paint. The method is successful only when a coating of at least 5 mils is applied to a thoroughly clean and dry surface during good weather. Electroplating and Metal. Fin. *9*,345 (1956).

THE TESTING of asphalts for suitability in surface coatings is discussed by Mathieu. PPV *33*, 210 (1957). THE WATER soluble degradation products of weathered asphalts include 1,2 dicarboxylic acids, active methylene compounds, phenols and aliphatic amines. ASTM Bull. *220*, 43 (1957). LEAD naphthenate improves the adhesion of asphalt emulsions. USP 2,786,775.

COUMARONE-INDENE, modified polystyrene, modified methyl styrene, and poly indene resins were studied in a variety of solvents by Zettlemoyer and Vanderryn. Precipitation temperatures of individuals and combinations were controlled by the highest molecular weight fraction present. The critical resin-solvent composition is lower than can be predicted from solubility parameters and the anomolies cannot be explained by current theories. IEC *49*,220 (1957).

TREATMENT of natural and synthetic resins with high boiling mercaptans and thiophenols decreases the molecular weight and yields compounds which are useful as plasticizers for petroleum resins. USP 2,736,723.

HECK discussed the chemistry of natural rubber and its treatment to the soluble forms, chlorinated rubber, rubber hydrochloride, and cyclo rubber, which are useful in coatings. PVP *47*, #9, 54 (1957).

NITROGEN—CONTAINING RESINS

Ureas and Melamines

A RUSSIAN publication recommends a urea formaldehyde ratio of 1/2.2 in a two stage condensation in butanol with pH ranges of 7-7.5 and 4.5-5.0 at 80-90°C. for optimum production of a high drying temperature coating. Khim. Prom. *1956*,280; CA *51*,1623 (1957).

LABORATORY methods for the preparation of butylated melamine and guanamine resins are described by Grimshaw. The effect of varying molar ratios is shown; a high formaldehyde content leads to slow curing while at low content flexibility and solubility are poor. A 4.5—5.0 formaldehyde/melamine ratio is recommended. The benzoguenamine resins have superior alkali resistance. JOCCA *40*, 1060 (1957).

DAGGETT found that the viscosity of an acid hardener (for ureas) dissolved in an alkyd decreased with aging, and that the decrease was greatest when butanol is present. The hardening power of the alkyd-catalyst decreases when the combination is allowed to stand several days, and it becomes ineffective in 1-2 weeks, when the viscosity was found to be equilibrated. No change in acid value is noted with a methyl orange indicator, but with phenophthalein the acid value was found to drop from 25 to 18. PT *21*,170 (1957).

THE IMPOSSIBILITY of determining water in dimethylol urea with Karl Fischer reagent has been traced to the formation of an addition compound with two moles of pyridinium iodide. Chem. Listy, *50*,2034 (1956). UREA is determined in cured or uncured resins by ammonolysis with benzyl amine, while melamine is treated with ammonia and analyzed as the picrate. Widmer claims that the method has an accuracy of about 90%. Kunststoffe *46*,359 (1956).

Isocyanates and Urethanes

BRUSHWELL reviewed the chemistry and uses of polyurethanes in coatings. APJ *41*,#27,31; #30,111; #44,107 (1957). DYER and Scott prepared polymeric and cyclic urethanes from ethylene carbonate and

amines. JACS *79*,672 (1957). Vinyl isothiocyanate has been prepared by reacting a beta-haloethyl isothiocyanate with an excess of tertiary amine. USP 2,757,190.

THE HYDROLYSIS of an aged isocyanate foam yields a solvent soluble polymer and an insoluble residue which are similar to the original resin. The polyisocyanate nuclei tend to accumulate in the non-extractable portion. Amine end groups have been formed during the aging process, according to Buxbaum. AC *29*,492 (1957). MARCALI designed a portable kit capable of detecting 0.01 parts per million of toluene diisocyanate in the atmosphere in a 10 minute determination. AC *29*,552 (1957).

THE PREPARATION in 92% yield of isopropenyl isocyanate and its polymerization with various monomers has been studied. CA *51*, 4045 (1957).

HALOGENATED isocyanates are reported to be more reactive intermediates for polyurethanes than the unsubstituted compounds. BP 752,931.

PHENOLICS

PHENOL-formaldehyde lacquers baked in an inert atmosphere of carbon dioxide or nitrogen are claimed to have better color, improved adhesion and electrical properties, and are less brittle. Ger. P. 902,358. ETHERIFIED or esterified vinyl phenols are readily polymerized with peroxide catalysts, but 2-hydroxy-5-methoxy styrene could not be polymerized by Williams, *et al.* J. Org. Chem. *21*,1461 (1956). GRISENTHWAITE and Hunter made assignments for a number of the peaks found in the infrared absorption spectra of some novolak and resole resins. J. Appl. Chem. *6*,324 (1956). DOOPER and Van der Valk find that boiling a varnish with methanol for 30-60 seconds extracts enough phenols to give a positive color identification reaction with p-nitraniline. Verfkroniek *29*,171 (1956).

HIGHLY branched liquid polyamides have been blended with heat reactive phenolic resins in an exothermic reaction leaving a stable product with about the same viscosity as the reactants. Wide variations in formulations can be used to make industrial baking finishes. OD *29*, 476 (1957).
PHENOL-FORMALDEHYDE adducts have been reacted with ethylene oxide to form polyalcohols which can then be esterified with drying acids to yield varnishes. BP 775,460.
FIX surveyed the utilization of phenolic resins in protective coatings . PVP *47*, #9, 42 (1957).

SILICONES

CAHN reviewed the position of silicone resins in the coating industry. APJ *41*,#42,81 (1957); ASTM Bull. *1957*, #222,30. BUNCEL and Davies report that a new class of peroxides, the organoperoxy silanes, will catalyze the polymerization of styrene. Chem. and Ind. *1956*,1052. HYDROXY containing polysiloxanes have been reacted with polyesters at elevated temperatures to produce baking lacquers. BP 761,370. POLMANTEER and Koch find that the sulfur vulcanization of vinyl siloxanes is dependent on the vinyl content and accelerator used. Strong organic bases, guanidines, and thiuram disulfides are the most active accelerators, while zinc oxide and organic acids inhibit and

retard the cross-linking. IEC *49*,-49 (1957).

THE COPOLYMERIZATION of a silicone containing monomer, methacryloxymethylpentamethyldisiloxane with methyl methacrylate, styrene, acrylonitrile and vinyl acetate has been studied. JPS *25*, 115 (1957).

BLOCK shows that the Bénard cells occuring in thin paint films which exhibit floating are due to local differences in surface tension rather than to heat convection, and explains why these effects are suppressed by monolayers of silicones. In thick films (2 mm.) the convective mechanism predominates and silicone is ineffective in reducing the phenomenon. Nature *178*,650 (1956).

STYRENES

Drying oil copolymers

HAMANN and Manz discuss the mechanism of the reaction of styrene with drying oil acids. Temperature and method of addition of the reactants are critical conditions, determining the formation of homo-or copolymer. Fette, Seifen, Anstrich. *58*,528 (1956). USP 2,761,850 claims clear copolymers of styrene and linseed oil by a preliminary heating of the oil above 200°C. with 0.05-0.2% selenium, while another patent claims the use of sulfur treated unsaturated hydrocarbons. Ger. P. 929,448.

VRANISH, *et al*, described fast drying oil copolymers with a high (60-80%) vinyl toluene content. The clarity of the product improves by increasing the amount of vinyl toluene, and although cloudy products may yield clear films, the reverse is also possible. Slow decomposing catalysts give clear products, while resins prepared in dilute solution have lower viscosities than when prepared at higher concentrations. A low reaction temperature leads to a higher viscosity. As the ratio of a catalyst mixture of t-butyl hydroperoxide di-t-butyl peroxide is increased, resin viscosity increases, and conversion is highest when this ratio is small or the monomer oil ratio is high. Dry is dependent on the vinyl toluene content and a short bake at 300°F. improves the alkali resistance. OD *29*, 56 (1957).

SHAH included turpentine as a chain terminator in styrene polymerizations. Ten percent in a formulation yielded a low molecular weight polymer which showed promise in surface coatings. PI *7*, 53 (1957).

Polystyrene

INFRARED analysis can be used to determine polystyrene in oils, alkyds and epoxys. Fraser and Pross have suggested suitable wavelengths for absorption measurements on the various components which can be calibrated against known standards for quantitative data. OD *29*, 75 (1957).

BIANCHI, *et al*, prepared monodisperse polystyrene by control of the initiation and termination steps in photosensitized polymerization. When the light was started, initiation of new chains and termination of growing chains takes place. In the dark, chain growth occurs, and transfer is minimized at low temperatures. Molecular weights from 0.5-2.5 million were obtained with over 50% of the material being monodisperse. JPS *25*,27 (1957).

LABELLED benzoyl peroxide has been used to study polymer initiation, and benzoyloxy radical initiators were found to decrease as the monomer concentration is reduced. Proc. Roy. Soc. A *239*,420 (1957).

OTSU found that while most organic polysulfides failed to thermally initiate or retarded styrene polymerization, tetraalkylthiuram disulfides were effective. All of the polysulfides except dibenzyl disulfide acted as photosensitizers. JPS *21*,559 (1956).

ATACTIC polymers are more soluble than isotactic styrene polymers, even when the isotactic polymer is in a metastable amorphous state, but the relationship between viscosity and molecular weight is the same. Methyl ethyl ketone is a selective solvent for separation. JPS *24*,161 (1957).

POLYESTERS

A NUMBERING system for plastics identification has been proposed and is illustrated by examples of various unsaturated polyester systems. Corrosion *12*,#1 -99 (1956).

DAMEN discussed the formulation of polyester paints. Paraffin wax prevents air inhibition of curing, while cellulose esters or alkyds aid flow properties. Solvents increase pot life, but can cause moisture deposition or blistering, and chlorinated materials inhibit cure. Basic pigments can react with the free carboxyl groups, carbon black inhibits cure, but finely divided silica can impart thixotropy to the system. A final polishing and removal of the surface layer is recommended. Verf. *29*,213 (1956).

MALTHA surveyed the pot life and curing of polyesters with various catalysts, promotors, regulators, fillers and pigments. The results are illustrated by a series of graphs. Verf. *30*, 79 (1957).

ALCOHOL soluble polyesters from P,P[1]-sulfonyldibenzoic acid esters have been prepared with titanium alcoholate catalysts and are suitable for films. USP 2,744,078; 2,744,096. ALUMINUM salts are suggested as polyester stabilizers in Ger. P. 943,380. SALICYLATE esters are claimed as light stabilizers in transparent polyester formulations. USP 2,773,049. CHOLINE chloride or its half ester with maleic anhydride acts a gelation inhibitor, reducing the amount of shrinkage during polymerization. USP 2,777,829.

WYCHERLEY calculates that 1.1-1.5 units of styrene are interposed between polyester chains. Chem. and Ind. *1956*, 431. GOTO, *et al*, found no straight polystyrene in cured polyester compositions. Mar resistance increases as the chain length between hydroxyl groups in the glycol increases and as the monomer reactivity ratio of the cross-linking agent increases. The heat of reaction increases with increasing monomer content. A large amount of inhibitor can cause an incomplete reaction. Chem. High Polymers (Japan) *12*,224,258,349 (1955-6); CA *51*,758, 1645 (1957).

BY ESTERIFYING citric acid with a glycol and then with allyl alcohol in the presence of an acid catalyst, a polyester is formed. It can be further cured *via* addition polymerization by peroxide catalysts. Plastics Tech. *3*, 555

(1 57). IMPROVED flexural st ngth of polyester laminates w observed by Wheelock when 2-m hyl-5-vinylpyridine was used in onjunction with styrene. By qu ternization, attractively colored pr lucts can be formed. IEC *4* 1929 (1957). POLYESTERS ca be prepared by reacting di-ba ic acids with the divinyl ethers of glycols, addition taking place ac oss the double bonds. BP 768, 30 .

H YES and Hunter show that th cis-trans conversion of maleic an ydride made into a polyester is substantially complete. A fully cu ed polymer of 1/1 styrene /fumarate had an average of 1.6 styrene units per cross-link. Chem. and Ind. *1957*, 559. THE INFRA-RED spectrograms of various poly-st rs have been interpreted and band assignments are given. CA *51*, 11753 (1957).

THE WALLACE micro indentation tester can be used to measure the degree of cure of polyester resins, needing only a small thin sample. Accuracy is lower with filled resins. CA *51*, 10944 (1957).

VINYLS

LIBERTI reviewed the most recent vinyl acetate copolymer formulating techniques. OD *29*,560 (1957). REITER summarized present concepts relating properties of poly (vinyl acetate) latices to particle size and molecular weight. CPVM *30*,#11,18 (1956).

P LY (VINYL ALCOHOL) and it copolymers have been reacted w h diketene to yield poly (vinyl a etoacetates). Ger. P. 887,123.

C KER studied the role of poly (inyl alcohol) as an emulsifying a nt in vinyl polymerizations. low viscosity grade, partially h drolyzed poly (vinyl acetate) c n be used in conjunction with a onic emulsifiers to yield fluid p lystyrene latices at 40% solids. I has a synergistic effect with other e ulsifiers, but behaves primarily a a protective colloid and will t erate substantial amounts of e ctrolytes. Redox styrene poly-m rizations proceed rapidly to high c nversions resulting in small par-t le size, thixotropic, mechanically stable latices with poor freeze-thaw properties. Medium viscosity, completely hydrolyzed poly (vinyl alcohol) is recommended for vinyl chloride work. The latex is freeze-thaw and electrolyte stable and tolerates other latices or organic solvents. Poor conversions were found with styrene-butadiene polymerizations. IEC *49*,382 (1957). GAST, *et al*, prepared vinyl ethers from fatty alcohols and acetylene with Friedel-Craft catalysts. Molecular weights varied with the solvent used, and gels resulted from polymerizations without catalysts. Conjugated diene and iodine values decreased during the polymerization. Films air dried in four hours and could be baked. They were attacked by alkali when on a Pyrex substrate but were resistant on soft glass or metal, and were solvent resistant, although swelled by benzene. The polymers could be emulsified with soaps under high speed agitation and films from emulsion are reported equal in properties to those cast from solution. Cobalt driers led to alkali degradation, but lead driers did not cause this sensitivity. Chemical and infrared analysis support the following mechanism for degradation, which occurs even with the saturated ethers:

$$>CHOCH_2R \longrightarrow CH_2O\underset{\substack{|\\ OOH}}{C}HR \xrightarrow{-H_2O} >CH_2O\underset{\substack{\|\\ O}}{C}R \longrightarrow \text{hydrolysis}$$

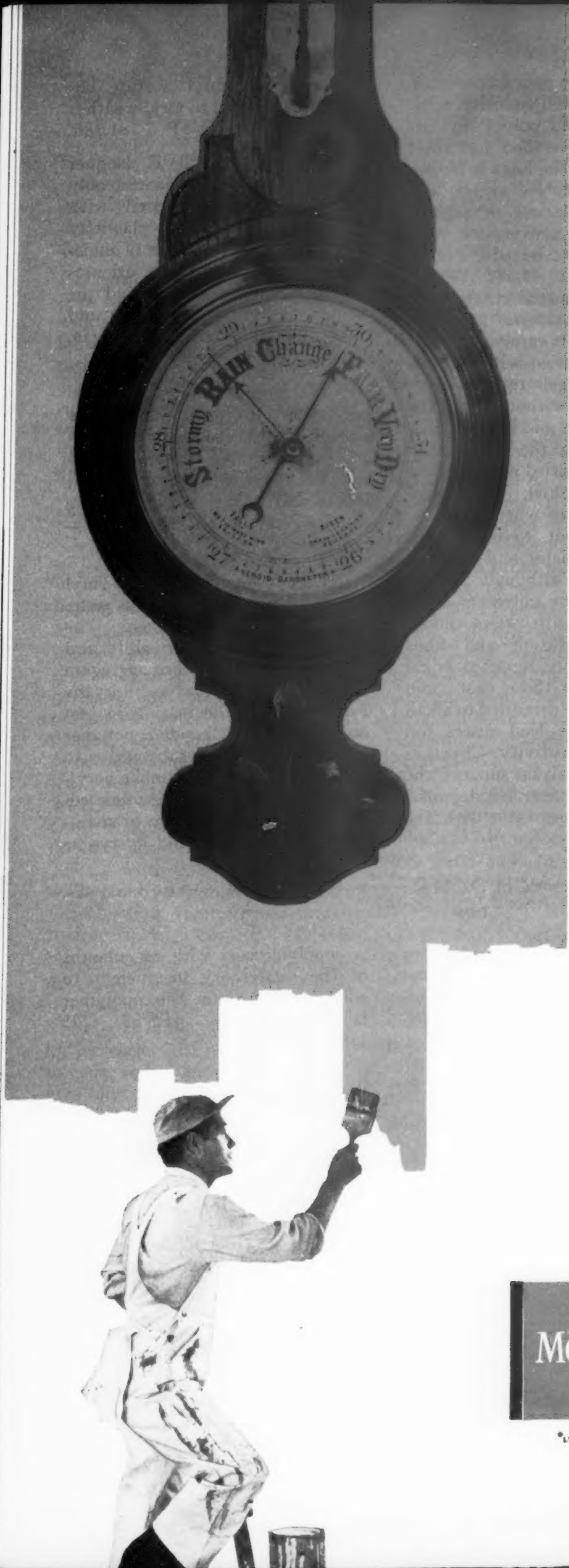
Molecular weights ranged from 1500 to above 15,000 and viscosity—molecular weight relationships are reported. JAOCS *34*, 244,307 (1957).

A TALL oil—vinyl acetate copolymer is claimed to yield weather resistant paints. USP 2,781,386.

AN ANTICORROSIVE lacquer is reported from chlorinated poly (vinyl chloride) plasticized with tritolyl phosphate. The plasticity varies irregularly because of molecular shape changes and orientation in a flowing stream, and the lacquer as a whole is plastic and thixotropic. Khim. Prom. *1956*, 465; CA *51*, 10087 (1957).

VINYL bromide has been copolymerized by either thermal or photosensitized reactions. The reactivity is similar to vinyl chloride, but all polymers show a weight loss on heat aging, and copolymers can be less stable than homopolymers. JPS *25*,19 (1957).

JONES and Goetz studied p-vinyl benzyl trialkyl ammonium salts in vinyl polymerizations. The monomers polymerize readily and polymer solutions do not aggregate with added salt, but exhibit the Fuoss effect of decreasing in viscosity. The acrylamide copolymer is water soluble and substantive to paper; small amounts make acrylonitrile dye receptive; styrene copolymers do not acquire or maintain static charges, and if styrene is copolymerized with an amount of the quaternary insufficient to solubilize it in water, the copolymer is self-dispersible. JPS *25*, 201 (1957).



Stormy
Rain
Change
Fair
Very Dry

LATEX EMULSIONS

LATEX emulsion paints enjoyed a steady growth during 1957. Estimates are that some 60 million gallons of this paint were sold last year, a strong indication that emulsion systems have established themselves firmly in the trade sales field.

Technological progress in this field was also noted in 1957. In this connection we have witnessed the first break-through in the development of gloss systems for both architectural and industrial applications.

Various approaches have been mentioned in the technical literature on the methods to produce gloss latex paints. Generally speaking, these methods involve special formulating techniques with a specially synthesized type of polyvinyl acetate copolymers of fine particle size. In the systems based on polyvinyl acetate copolymer there are three essential characteristics that the latex must possess to be suitable for making high gloss paints:

1. Films cast from the latex emulsion should be free of haze and be of high gloss. This means that the resin particles must exhibit excellent coalescence properties at normal or near normal temperatures.
2. The composition of the emulsion must be such that all components are completely compatible with each other and with all of the ingredients to be used in the final paint formulation.
3. The latex must exhibit high critical Pigment Volume Concentration.

For formulating water-thinned industrial finishes and primers, a styrene-butadiene latex gained wide-spread interest during 1957. This particular latex is a stable, colloidal dispersion of high molecular weight styrene-butadiene resin particles in water. At room temperature the emulsion forms a slightly tacky film which, when baked under proper conditions, becomes a tack-free, hard, glossy, tough film—strongly adherent to many surfaces, particularly metal.

The basic properties of this latex emulsion suggest utility as both primers and one coat protectors for such items as toys, file cabinets, bedsprings, automobiles, etc.

For the automobile and appliance manufacturer, water thinned finishes of this type have one big advantage—the elimination of fire hazard on the finishing line which is always prevalent with solvent–based coatings.

Problems which have plagued producers of polyvinyl acetate latex coatings are poor water spot resistance and poor wet adhesion to substrates. These problems have been overcome in 1957 by a new polymerization technique which eliminates the need for water sensitive emulsifiers such as polyvinyl alcohol necessary for the successful polymerization of vinyl acetate.

Improved types of conventional latices were introduced during the past year. Among these were polyvinyl acetate copolymer with better water resistance and stability; a vinyl acetate and vinyl stearate copolymer with high water resistance, fine particle size, good flexibility and adhesion; vinyl acetate copolymer with improved adhesion; an acrylic emulsion with higher solids content; an acrylic emulsion exhibiting non-yellowing properties, good brushability properties, resistance to water spotting; an acrylic emulsion for producing hard films at elevated temperatures and to modify softer emulsions. In addition a hydrocarbon resin emulsion recommended as a cobinder with latex vehicles to improve water resistance, flexibility, adhesion, and stability was also made available to latex paint manufacturers in 1957.

LATEX EMULSIONS

HEIBERGER reviewed aqueous coatings from the vehicle, pigment and formulation standpoints, emphasizing unsolved problems in the field. OD *29*,100 (1957). WESTGATE reported on the status of work of the ASTM committee on latex and emulsion paints. APJ *41*,#35,86 (1957). ASTM work on the study of the quality of the water in artificial weathering apparatus finds no difference between tap or deionized water in chalking and fading activity when the tap water does not stain the panels, but three out of six samples of water in various regions did this. The largest error in gloss and chalk determinations is due to individual machine variations or methods of operation. Singleton reports that, in a given region, the experimental error in gloss determination variation with exposure time can be very large. APJ *41*,#36,36 (1957).

MOORE and Bell discussed surfactants in the paint industry, emphasizing the oxyethylated compounds. Basic equations for wetting and sedimentation are reviewed, and the variation of properties with the number of oxyethylene units is shown for hexadecyl alcohol derivatives. Their use in grinding, adhesion aids, pigment treating, putty, emulsions, antistatic coatings, paint removers, is shown, and other areas of application are suggested. PT *21*, 199 (1957). SOAPS were found to lower the stability of latex towards zinc oxide, but alkylaryl sulfonate surfactants show no effect. Sodium phosphate or citrate prolongs the coagulation time, and the stabilizing reaction is stronger when non-ionic activators are used together with sequestering agents. CA *51*, 9195 (1957).

THE INFLUENCE of thickeners on PVA paint rheology is reported by Baseden. Different thickeners produce different shear stress/rate of shear curves, and since brush drag is related to the slope of the curve, the least drag was found with carboxymethylcellulose where shear stress decreased most rapidly with the time under shear. Brush drag is said to be governed by the state of dispersion of pigments and by the rate at which the fineness is increased by shear under the brush. Ionic thickeners agglomerate flocs slowly on standing. Cellulose ethers develop a three dimensional structure more rapidly. JOCCA *40*, 37 (1957).

A COMPOSITION stable towards calcium sulfate is claimed in USP 2,778,740. THE SODIUM salts of chlorinated phenols are said to aid freeze-thaw stability of latices. USP 2,773,849. CHELATING agents which render latices noncorrosive to iron surfaces are noted in USP 2,776,918.

THE STORAGE stability of polyvinyl acetate emulsion paints was studied by Chatfield. Hydroxyethyl cellulose shows a greater tendency to become thixotropic than methylcellulose, but both regain fluidity on aging. At high stabilizer concentrations the viscosity drops markedly on standing. Increasing the wetting agent aids flow. The effects of various pigments are shown, and a careful balance of pigment, wetting agent and stabilizer is necessary for optimum results. PM *27*, 340, 386 (1957).

CARPENTER, *et al*, described the properties and uses of a new catalyzed styrene-butadiene latex for glossy finishes on metal surfaces. At an acid pH, enough iron is ionized from the substrate to catalyze the conversion, but at neutral or alkaline pH, an external drier is necessary. APJ *42*, #4, 88 (1957); OD *29*, 980 (1957).

INTERNALLY plasticized vinyl acetate-vinyl caprate copolymers have been compared to externally plasticized vinyl acetate emulsion paints by Fletcher and Wilson. Di-(butoxyethyl) phthalate and polyester plasticized homopolymers were equal to the copolymer in flexibility retention. No breakdown occurred with either resin under accelerated weathering where the plasticizer could not migrate into the substrate. Both resins showed equal scrub resistance and color stability. JOCCA *40*, 693 (1957).

BROWN suggests that film formation from latices is due to the driving force provided by capillary pressure. This overcomes the resistance of the polymer particles to deformation. The conditions for film formation have been expressed in terms of surface tension and particle size of the dispersion, the time available for drying, temperature, and the rheological properties of the polymer. JPS *22*, 423 (1956).

AN AQUEOUS solution of zinc ammonium alginate and zirconyl ammonium carbonate has been claimed as a binder for water paints, producing washable films. USP 2,780,555. A POLYVINYL acetate powder which is readily emulsified is described in BP 753,173.

SOLVENTS

IMPROVEMENT in petroleum solvents to meet the exacting demands of the paint industry dominated solvent technology during 1957. One development was the introduction of an aliphatic solvent which had the characteristic of combining drying speed with flash point elevation and another with improved odor without sacrificing solvency. In addition petroleum solvent producers introduced a line of specialty solvents to meet the exacting boiling range and evaporation demands of new vehicles and coating formulations. This has been the result of a trend on the part of paint manufacturers to switch to low-odor type solvents as a compromise between regular mineral spirits and the odorless type solvents.

Several important technical papers on solvent technology appeared in the literature during 1957. These include:—

A solvent formulating chart showing at a glance all of the pertinent data which must be considered when choosing a solvent for a given formulation.

Solubility parameter of resins enables one to select scientifically the correct solvent for coating formulations. Specifically, it broadens the application of the solubility parameter by reporting values for numerous typical resins used in coatings.

A study on the effect of solvent properties on the viscosity of alkyd resin solutions showed that for long oil alkyds, solvent viscosity is more indicative of the viscosity reduction ability of a solvent than either its solvent power or the hydrocarbon type. Known solvent viscosity and resin concentration permits reasonably accurate predictions of resin solution viscosity up to a 30 percent solution of long oil soya alkyd. At higher concentrations, solvent power and hydrocarbon type come into play. On short oil soya alkyds, work with a wide variety of naphthenic and aromatic hydrocarbons show that the predominant factor in determining resin solution viscosity is solvent power.

The high-low solvent principle for formulating wood lacquers was an interesting piece of research work carried on last year. It is claimed that these lacquers have the ability to provide desired film thickness in one or at most two-coat spray operations using conventional cold-spray equipment.

In the way of new solvents marketed in 1957, two types are worth mentioning.

2-Nitropropane, one of the nitroparaffin family, has some special advantages in the formulation of epoxy finishes, vinyl spray finishes and acrylic formulations. Among the improvements imparted to the finish by using 2-Nitropropane are greater chemical resistance, lower viscosity, more uniform evaporation rates, improved flow, reduction in pinholing and water permeability.

Three petroleum solvents, all in the mineral spirits distillation range, were developed for a variety of end uses.

One is suggested for special industrial finishes where the evaporation rate is twice as fast as conventional solvents.

Another is recommended for interior paints to enhance the wet edge characteristics. This solvent is said to evaporate completely, but more slowly than conventional mineral spirits.

Another is a completely odorless, alkylate-type petroleum solvent which evaporates more slowly than ordinary mineral spirits, and is recommended for high quality odorless interior paints.

SOLVENTS

STOLOW studied the action of solvents on drying oil films. Leaching is dependent on time of exposure, film age and solvent used. Low molecular weight components are extracted slowly, but the action is aided by swelling of the films. As the solvent acts on a virgin film the density increases and the film attains a lower swelling potential; linseed oil films approach a limiting non-swellng structure of density = 1.2. Unsupported films swell isotropically. Cohesive energy density and solubility parameters of solvents are more indicative of the degree of swelling of films than molecular volumes. Mixed solvent systems were investigated and instances of maximum swelling occur. Fick's law applies to the diffusion of solvents through films except in regions of high swelling. The rate of swelling is higher than the rate of shrinkage. The diffusion coefficient is more dependent on the solvent than on the film and is lower in pigmented systems. Ketones and aromatic hydrocarbons diffused most rapidly, while alcohol diffusion was found to be slow. JOCCA *40*, 377,488 (1957). Nature *179*, 579 (1957).

THE RELATIVE volatility of the least soluble component in a multicomponent system is higher than in a binary mixture. The volatility is increased at a higher concentration if the component is soluble only to a limited extent. IEC A *51*, 809 (1957). YATES developed a two parameter equation relating instantaneous vapor/liquid equilibria in binary systems. JACS *79*, 1037 (1957).

NEDWOCH examined the evaporation of organic solvents containing water. With isopropanol, the residue becomes enriched in water, but normal or secondary butanol show the opposite effect, while methyl ethyl ketone maintains a constant water content. FL *62*, 462 (1956).

MERRETT studied graft polymers of rubber and methyl methacrylate in different solvents. In benzene with a limited amount of ethanol, the hydrocarbon chain collapses forming colloidal particles solubilized by the methacrylate chains. Polymers obtained from this system show good adhesion, are hard, and show modulus reinforcement. Polymer obtained from a solvent system which collapses the methacrylate chains is soft and has poor adhesion and tear strength. The configuration conferred by the solvent is found to be retained in the isolated polymer. JPS *24*, 467 (1957).

THE SOLUBILITY of alkyd resins in hydrocarbons is a function of oil length, solubility parameter and solvent molar volume. Reynolds reported good correlation between solubility of alkyds (measured by the dilution limit technique) and Kauri-Butanol or Aniline Cloud Point values, but for melamine resins solubility was very sensitive to aromatic content and naphthenes are inferior to toluene-hexane blends of lower KB. Solubility parameter alone is not a practical measure of solvent power. OD *29*, 966 (1957).

NUMEROUS solubility parameters for solvents and resins have been presented. The usefulness and applicability of the concept is discussed. OD *29*, 1069, 1159 (1957); APJ *42*, #7B, 24 (1957).

KUBLER recommends vinyl chloride as a propellant for aerosols. It has a satisfactory vapor pressure, compatibility with paint solvents, high ignition temperature, lack of odor and no physiological effects in the concentrations used. Deutsche Farben Z. *10*, 450 (1956).

LONG and Gerhard surveyed the use of nitroparaffins as solvents in the coatings industry. They are primary or latent solvents, depending on the resin. Storage stability is claimed to be better with 2-nitropropane than comparable epoxy formulas with ketones, and drying times are reduced. Even higher molecular weight epoxys can be sprayed, and improved nitric acid resistance is reported for the films. OD *29*, 542 (1957).

EPSTEIN, *et al*, analyzed the 126-132°C. hydrocarbon fraction of petroleum which consisted of 53% ethyl cyclohexane. Substituted cyclopentanes and cyclohexanes were the other major constituents of this fraction. AC *28*, 1924 (1956).

TWENTY two hydrocarbons have been separated and identified in the 116-126°C. fraction, containing mainly C_8 compounds. AC *29*, *357* (1957).

SOLVENT selection for paints was discussed by Rasmussen, pointing out the reliability of viscosity reduction measurements as opposed to aniline points or Kauri-butanol values. Curves compare evaporation rates of fractions of hydrocarbons including aromatics, aliphatics, and naphthenics both alone and from different resin solutions. Humidity does not appreciably affect the evaporation rate except in the case of water-base paints. OD *29*, 895 (1957).

THE HIGH-LOW solvent system has been discussed by Buller, who recommends a volume mixture of 65% fast and 35% slow evaporating solvents for wood lacquers. PVP *47*, #9, 25 (1957)

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PIGMENTS

PIGMENT developments in 1957 were centered mainly on universal tining colors which can be added to oil, alkyd or latex systems. These tinting colors met with considerable favor among paint manufacturers as they may be simply added to the base vehicle without grinding. Only a mixing operation is necessary for complete dispersion in the vehicle. In the interest of simplifying paint production, particularly grinding operations, pigment producers have placed special emphasis and pigments featuring easy grinding properties by developing a variety pigment special emphasis on developing a variety of pigment dispersion. One trend has been the increased use of water dispersed colors which can be added to practically any paint vehicle by mixing.

Improved pigments of all types were offered to the paint manufacturer during the past year.

An interesting development was the introduction of a complex lead pigment consisting of active lead compounds on the surface of each pigment particle, which is said to provide chemical reactivity a low cost in house paints.

The use of aluminum pigment in water emulsion systems became a reality with the availability of an aluminum pigment treated with ammonium phosphate. This specially treated pigment showed good can stability with butadiene-styrene, acrylic and polyvinyl acetate emulsions over long periods of storage.

Other important pigments introduced during 1957 were pyrazolone red pigments with high heat resistance; phthalocyanine blue toner with non-flocculating and non-crystallizing properperties; a line of vat colors ranging from yellow to deep red with good light fastness properties and easy dispersion characteristics; a manganese-BON red pigment with good exterior durability; a line of water dispersible pigment pastes for latex emulsions featuring high solids content, good compatibility and high tinting strength; four depths of chrome green with soft grinding properties and non-reactivity in a wide range of vehicles; synthetic iron oxide tan pigment with good heat stability providing good gloss in baking enamels; a de-aerated form of zinc oxide with a density about half of ordinary zinc oxide which stores in less space and increases mixing capacity; a special type of tarnish-resistant gold bronze for use in polyvinyl chloride vehicles; a synthetic pearl essence with a luster greater than obtainable from natural materials.

General and Miscellaneous

WORMALD published an extensive up-to-date discussion of colored pigments for paint. After an introductory definition of terms, chemical and physical properties of individual pigments are compared and their advantages and disadvantages noted. Light fastness, durability, tinting strength, cost, hiding power, grinding and baking properties, can stability, flocculation resistance, bleed and chemical resistance are tabulated for yellows, oranges, blues, violets, reds, maroons and greens. PVP *47*, #4, 37; #5, 35 #6, 43 (1957). CARR and Musgrave summarized the behavior of organic pigments in high temperature systems. Heat stability, light fastness, and suitability in baking enamels, laminated plastics, and bulk plastics are tabulated.

JOCCA *40*, 51 (1957). ELM discussed the function of pigments in paints. The effects on hiding, yellowing, water resistance, seeding, chalking and corrosion are summarized, with an emphasis on zinc oxide. OD *29*, 351 (1957).

BRUSHWELL reviewed the chemistry and technology of inorganic and organic pigments. APJ *41*, #45, 66; #47, 67; #48, 93; #49, 68; #51, 72; #52, 104 (1957); *42*, #1, 94; #5, 126; #8, 84; #10, 124 (1957).

THE SEDIMENTATION of powders in liquids depends on the polarity of the medium. Wolff reports that the final volumes are smaller in polar liquids but that rate of sedimentation is greater. Increasing temperature hastens settling while surfactants slow sedimentation and reduce the final volume. Coarser powders settle faster but particle size alone does not determine the final volume. Kolloid Z. *150*, 71 (1957). DINTENFASS showed that the viscosity of a pigment suspension correlates with the sedimentation volume only when the suspension is Newtonian and completely deflocculated. Sedimentation volume is a function of particle shape, vehicle viscosity and temperature, and can be regarded as the effective rheological volume of the pigment. Chem. and Ind. *1957*, 141.

FIELDING and Gutman measured the electrical conductivity of various phthalocyanines at elevated temperatures and found that they are intrinsic semiconductors and that introduction of a metal atom produces little change in the activation energy of conduction. Optical transmission data for solutions and thin evaporated films are reported. J. Chem. Phys. *26*, 411 (1957).

FLORUS and Hamann, investigating the electrophoresis of paints, found that inorganic pigments act alike in the same binder, being positive, negative, or neutral, depending on the surface activity, but organic pigments carry a charge independent of the medium. Wetting and flow agents can control the charge of inorganic, but not organic pigments, and there is a close relation between pigment charge and dispersion stability, affecting gloss, hiding power, brushability, flow, and absorption. FL *62*, 260,323 (1956).

THE ASTM recommends three parameters for reporting particle size characteristics:

a) Particle size — specific surface diameter.
b) Coarseness — diameter below which 99.5% of the pigment falls.
c) Dispersion parameters, calculated from the cumulative weight distribution curve.

These are obtained by microscopic, sedimentation, turbidimetric, absorption and permeability techniques in ASTM Method D-1366-55T.

GARMSEN gives hiding power—pigment content curves for differently pigmented paint films and deduces a relation assigning unique values for each pigment. The hiding power of pigment mixtures can then be calculated. Deutsche Farben Z. *10*, 363 (1956).

SURFACE details in electron micrographs of zinc sulfide and lithopone are more readily observed if carbon is evaporated onto the pigment particles which have been shadowed with gold and palladium. The pigment is dissolved from the carbon by dilute hydrochloric acid. Brit. J. Appl. Phys. *7*, 373 (1956). ROSE describes a reflectrometer to rapidly assess the characteristics of fine powders. It can determine the mean particle size of powders under 0.5 microns and can be used in control work and for color matching of dry pigments. PT *21*, 91 (1957).

GRANULAR titanium dioxide ground in a ball mill with a polymerizable monomer produces finely divided particles with fractured surfaces which can react with the monomer. The product is completely hydrophobic and organophilic. USP 749,248.

UNSATURATED isocyanate vapors have been contacted with pigments or glass fibers to render them hydrophobic. USP 2,780,612.

ORGANOPHILIC pigments can be produced by coating them in an anhydrous solvent with a long chain isocyanate. USP 2,789,919.

WERNER complexes of trivalent chromium are suggested for treatment of pigments to render them easily dispersed in polar liquids, and to maintain the dispersibility of pearlescent pigments. USP 2,769,721.

PEDERSON found that phthalocyanines can be reversibly oxidized in non-aqueous media. The products are soluble in organic solvents and can be regenerated by reduction. J. Org. Chem. *22*, 127 (1957).

THE DISPERSION of phthalocyanine blue has been studied by the New York Production Club. Dispersion efficiency is best determined by tinctorial strength, and high loading of a steel ball mill results in efficient production, although a slight loss in tint strength occurs. OD *29*, 1113 (1957); APJ *42*, #7B, 8 (1957).

THE USE of molybdenum disulfide as in synthetic resin films is discussed by Lonsky. A constantly renewed lubricated surface can be achieved which shows a marked reduction in the coefficient of friction. Fette, Seifen, Anstrich. *58*, 518 (1957).

PFLEIDERER suggested the mercury-cadmium sulphides as cheaper alternatives to cadmium selenosulfide pigments. The sulfides form a range of mixed crystals ranging from light orange to dark red-brown. They can be used in baking finishes but not in ceramics, as mercury (II) sulfide sublimes at 580°C. They are alkali resistant and non-bleeding. Fette, Seifen, Anstrich. *58*, 1073 (1956).

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A RUSSIAN study of eight red iron oxide pigments indicated the same amount of small particles (< .01μ) which do not affect the shade. Yellows and reds showed peaks with radius of about 0.15 microns, and as the shade deepened, the peak shifted towards higher values. The particle size and the proportion present in the range 0.1-0.3μ affects the color. CA *51* 7033 (1957).

DIAMAGNETIC alpha iron oxide readily disperses in vehicles and resists sedimentation, but the gamma isomer (paramagnetic) agglomerates and sediments rapidly. Heinle reports a third form which is a mixture of the first two, showing intermediate properties and flocculation in coatings because of the separation of the two forms on againg. Differences in dispersion by porcelain or steel balls can be explained by the magnetic properties of the iron oxide. Deut. Farben-Z. *11*, 217 (1957). ELEVEN IRON oxide pigments showed excellent color stability on exposure, although the iron oxide content varied widely. Most show a slight tendency toward color flotation. Dirt collection was light and no mildew, checking or cracking was found. OD *29*, 1144 (1957):, APJ *42*, #7c, 10 (1957).

TRANSPARENT films containing fluorescent dyestuffs which normally produce a haze can be rendered haze free by the addition of small amounts of colored heavy metal salts of iron, cobalt, nickel and copper. USP 2,778,741.

THE MAIN constituents in lead and zinc chromates can be analyzed polarographically in one operation by a method developed by Baltes and Wiertz. PPV *33*, 222 (1957).

STUDIES of photochemical changes on pigment surfaces are described by Clay. Titania acts as a photocatalyst for the oxidation of an organic binder. Lead chromes evolve carbon monoxide on irradiation. The apparatus for studying these effects and their implications are presented. JOCCA *39*, 935 (1957). THE SURFACE of pigments consists of a number of differently active areas according to Dintenfass. Various polar groups such as amine, carboxyl or hydroxyl can be absorbed simultaneously without mutual interference. Chem. and Ind. *18*, 560 (1957).

LUDWIG tabulated the bleed resistance of fifty one organic pigments towards sixteen different media. Moore listed standard identification tests for many ink pigments. Am. Ink Maker *35*, #5, 43, 50 (1957). SIMPLE TESTS for classifying organic red pigments and for the identification of molybdate orange, cadmium red and vermilion are given in POCR *120*, #11, 6 (1957).

DANZIGER discussed the performance of molybdate orange in various formulations, emphasizing its hiding power, lightfastness and tinting strength. APJ *41*, #26, 43 (1957).

DIBASIC LEAD phosphite is said to stabilize a paint against cracking and improve the gloss retention. USP 2,783,160. A ZINC oxide containing a small amount of oxyhalide acts as a non-toxic fungus inhibiting extender pigment. USP 2,769,716.

Whites

QUANTITATIVE analysis of anatase-rutile mixtures by an x-ray diffractometer is reported. AC *29*, 760 (1957). TITANIUM has been determined rapidly and accurately

by an automatic derivative spectrophotometric titration. AC *28*, 1885 (1956).

ALTHOUGH the best way to distinguish between anatase and rutile titanium dioxide is x-ray diffraction, Lamprecht suggests a simple iodometric method based on the differences in photochemical activity. FL *63*, 342 (1957). CASTOR and Melsheimer reviewed the optical properties of titanium dioxide pigments, relating color, hiding and stability to the absorption spectra. PVP *47*, #10, 29 (1957).

A COMPOSITE magnesium oxide-barium sulfate pigment resulted from an attempted preparation of a magnesium lithopone. The pigment does not have sufficient opacity to be used by itself, but performed well in outdoor durability tests, leaving a clean appearance. PI *6*, 77 (1956).

RISCHBIETH tested the weathering characteristics of zinc oxide pigments in Australia. The direct process, acicular or nodular pigments were chalk resistant while French process and colloidal oxides showed bad chalking in three to four months. Outdoor exposure in the summer of pigmented raw linseed oil films sprayed with water was found to be a quick, reliable test method. Anatase accentuates the differences between the two grades while pigments of good durability level out differences, which decrease as the zinc oxide content decreases. The type of zinc oxide used in a primer is not significant. JOCCA *40*, 212 (1957). FAURE determined zinc in pigments by titration with ferri/ferrocyanide and a redox indicator. The influence of other ions, and methods to remove interferences is described. PPV *33*, 340 (1957).

Extenders

CALCIUM sulfate pigments can be made with improved blanching properties when treated with long chain primary amines. USP 2,776,222.

ARMSTRONG and Croutch describe the use of nepheline syenite as an extender pigment. It is nodular, white sodium-potassium-aluminum silicate of 2 micron average size with a brightness of 94.5 and a refractive index of 1.54. The oil absorption is low and stable paints of good exterior durability have been made with it. It is equivalent to low oil absorption calcium carbonate in settling and stability, but has slightly better dry hiding. Enamel undercoat formulations show excellent sealing and hold out over absorbent surfaces. The pigment promotes flow and levelling, disperses easily, has a low gloss and sheen, and is non-yellowing. It can be used in latex paints with suitable dispersants, having a low water demand and resulting in dilatent systems. Grinding data and metal primer performances are presented. OD *29*, 272 (1957).

THE USE of mica in aluminum, emulsion, and anticorrosive paints and its effect on pigment settling was discussed by Genin. PPV *33*, 631 (1957).

SONSTHAGEN investigated the influences of various extenders on paints. The usefulness of certain forms of talc in preventing hard settlement and the improvement in durability effected by carbonates is shown. PM *27*, 101 (1957).

AN EXTENSIVE review of the preparation and applications of inorganic extenders appears in PPV *33*, 421 (1957).

Blacks

THE VARIOUS parameters determining the electrical conductivity of carbon black loaded polymers, such as particle size, nature and extent of surface, concentration, dispersion, and structure are surveyed by Polley and Boonstra. A new grade of high conductivity black is presented. Rubber World *134*, 721 (1956). DONNETT and Marquier show that the viscosity and flocculation properties of a carbon black suspension depends directly on the dielectric constant of the vehicle. The pigment is regarded as a polyelectrolyte because of the occurrence of chemically active groups on the surface. JPS *23*, 601 (1957). DILUTE suspensions of carbon black have been spectrophotometrically an-

lyzed in the violet and red regions, and a color index is found to be related to the particle diameter. Firenza suggests applications of the technique to batch analysis, composition determinations and factor control. Rubber Age *80*, 69 (1956).

A SIMPLE measurement of the reflectance of fine black powders can be used to determine the mean particle size. Rose indicates that diameter-reflectance curves are usually continuous, but the exact relationship is not determined. J. Appl. Chem. *7*, 244 (1957). HIGHLY OXIDIZED carbon blacks show infrared absorption bands due to hydroxyl, carboxyl and carbonyl groups, but no quinonoid structure. Rubber Age *81*, 96 (1957). MOISTURE absorption of channel blacks is faster than for furnace blacks. At low humidities the volatile content is more important than the specific surface area, but the reverse is true at high humidity. Carbon black in rubber retains its ability to adsorb polar molecules. Rubber Abe *81*, 96 (1957).

THE DISPERSION of carbon black was discussed by Venuto. JOCCA *40*, 725 (1957).

Metallics

SURRIDGE reviews the use of finely divided metallic lead in extended paints in varied environments, claiming protection equivalent to that of red lead. Corrosion Tech. *4*, 69 (1957). A RAPID method for the determination of litharge in powdered lead has been described. Anal. Abs. *3*, 3594 (1956).

THE ADDITION of flaked metallic lead gave better adhesion, flow, drying and hiding to red lead primers. Armstrong and Mullaly reported satisfactory formulations of metallic lead pigmented vinyls, epoxys, chlorinated rubber and other resins. PIM *72*, *#3*, 16 (1957).

REHNER and Klimits determined the theoretical covering power of aluminum pigments by spreading the paints on water.

AN IMPROVEMENT in the method is the use of a petroleum ether wash to decrease the tendency of the pigment to become lyophilic. Violent agitation insures thorough dispersion of the pigment agglomerates. FL *62*, 464 (1956).

DRYING OILS AND DERIVATIVES

DRYING oil technology was generally quiet during 1957. However, there were a few significant developments which warrant our attention.

Perhaps the most important of these developments was the use of caster oil as a major component in polyurethane coatings. In this connection another development is the use of dehydrated castor oil fatty acids for modifying epoxy resins.

Isano oil was introduced to the paint industry for the first time in 1957. This is a vegetable oil which contains several fatty acids with conjugated acetylenic bonds. However this oil does not dry, but it can be processed into a drying oil. One of the more important uses of this drying oil is in the formulation of fire retardant paints, as a built-in intumescent vehicle. When heat strikes at paint containing this oil, a puffing action takes place which has a smoldering and insulation effect.

An interesting study concerning the mechanism for the decomposition of drying linseed oil films in the presence of ultra-violet light was conducted by a Navy research group last year. It was observed that ultra-violet light in the presence of oxygen caused the linseed oil film to break down into carbon dioxide and low molecular aldehydes and acids and in some cases methyl alcohol is formed.

A reduction in the price of vinyltoluene has spurred more active research in the use of this monomer with vegetable oils. This has resulted in the development of a vinyltoluene-vegetable oil copolymer with controllable thixotropic properties and has possibilities in the formulation of flat interior wall paints. Another result of this research has been the use of vinyltoluene modified oils as fast drying vehicles for paper coatings, surface conditioners for masonry paints, enamels and hammer finishes.

A study of the outdoor durability of tall oil phthalic alkyds revealed that these alkyds, whether made from acid-refined or distilled tall oil have durability comparable to most conventional alkyds of rosin and soya fatty acids. In contrast, alkyds made from very-high-viscosity tall oils may have poor durability.

Drying Oils

FAUVE analyzed freshly extracted linseed oils and made bodied oils, alkyds, and paints. Various properties can be related to the linolenic content of the starting oil. PPV *32*, 672 (1956).

KAMALA seed oil decreases in iodine value and refractive index as the oil is bodied, and the viscosity increases more rapidly in air than in an inert atmosphere. The total seed oil and extracted fractions gel more rapidly than tung oil. PI *6*, #8,17 (1956).

LOW temperature fractionation of Kamala seed oil suggests that it is composed of complex triglycerides in which the fatty acids are condensed with the hydroxyls of Kamlolenic acid as well as with glycerol. PI *7*, 55 (1957).

SOYBEAN oil is found to have a random glyceride distribution. Scholfield and Hicks used countercurrent distribution and reported 53% of the oil present as oleodilinoleins or higher unsaturates. Palmitoyl glycerides move through the column as fast as oleyl compounds and more rapidly than stearoyl glycerides. JAOCS *34*, 77 (1957).

SOYBEAN OIL from various sections of the United States varies from 5.9-8.3% in linolenic acid and 45.3-50.4% in linoleic acid. The percentages of the two acids correlate with each other. JOCCA *34*, 491 (1957).

Analysis

DeCONINCK and Delacourt determined the foots content of raw linseed oil by flocculating with dilute nitric acid and centrifugation. The influence of the flocculating agent, temperature, water content, acidity and reproducibility of the method is discussed. A second flocculation yields a further 1-1.5%, but the oil still contains an appreciable phosphorus and ash content. Phosphorus is found in refined oils with a zero foots analysis. Chim. Peint. *19*, 445 (1956).

THE DETERMINATION of linseed oil foots content should be done by three methods to yield a maximum of information. Fahnrich recommends (1) a four day sedimentation at 20°C., (2) sedimentation at 40°C. to determine the foots soluble in warm oil and (3) the latent foots content of the clear oil by calcium chloride-hydrochoric acid. FL *63*, 5, 65 (1957).

KOZIN describes a falling film molecular still used in the fractionation of drying oils. Analyses were run on 5-7 fractions separated over an interval of 150-270°C. CA *51*, 1627 (1957). POUCHON discussed the applications of spectrophotometry to the analyses of linseed oil. A statistical evaluation of a large number of samples indicates variations in composition with the origin of the seed. Chim et. Ind. *77*, 547 (1957). KARTHA developed a new method for calculation of the glyceride structure of fats by use of the azelaoglyceride number. J. Sci. Ind. Research *15B*, 724 (1956).

AN OPTICAL density measurement at 500 millimicrons was proposed by Pohle and Tierney for evaluating the color of oils. The method provides an accurate estimate of color removal on bleaching. JOCCA *34*, 485 (1957). LUDDE reported a method for obtaining the iodine value of an oil from the dispersion reading of the Abbe refractometer. Several of the optical properties vary with the age of the oil. CA *51*, 7741, 8454 (1957).

THE VISCOSITY of a blend of two paint liquids is given by the formula $m-(m-n)x-4\iota x+4zx^2$, where ι is an experimentally determined constant, m and n are viscosities of the individuals, and x is the concentration of the less viscous component of n viscosity. Angelini found that Einstein's formula can be used for mixtures of bodied oils containing up to 30% of the more viscous liquid. Pitt. e Ver. *12*, 35 (1956).

Alcoholysis and Transesterification

MRAZ, Silver, and Coder studied the alcoholysis of oils with pentaerythritol. Although the methanol dilution test gives a large variability of results, in general it is a reasonable indication of the completeness of reaction. The authors suggest instead a four to one dilution of the reaction mixture with an 80/20 blend of dimethyl sulfoxide and dioxane; if no single crystals of alcohol appear, the reaction is complete. Dilution with isooctane and weighing the residual pentaerythritol showed that the reaction equilibrates with 90% of the polyol reacted (27% phthalic formulation). Light scattering data indicates clarity of the reaction mass when only 50-55% of the polyol has reacted. High acid value oils can exhibit a slightly slower rate of alcoholysis. Very low acid value oils increase in acid value by hydrolysis or de-esterification before the rate of alcoholysis increases to normal, and the rate of the hydrolysis depends on the rate of solution. Suggestions for increasing the rate of alcoholysis are to include a portion of previously alcoholized oil or to react an initial fraction, reducing the wall contact time. Hazing with a litharge catalyst is dependent on the catalyst concentration and can be reduced by the use of phosphoric acid. The influence of litharge concentration on the rate is appreciable in lower amounts but levels out at higher concentrations.

A LOWER catalyst concentration offers better clarity and data indicate a more complete removal of lead by filtration. OD *29*, 256 (1957).

THE EXTENT of glycerolysis has been found to be dependent on the proportions of the reactants. Fractionation experiments point to the probable formation of polyglycerol derivatives. The hydroxyl value of the product is lower than the calculated value for the monoglyceride. Side reactions of dehydration and polymerization can be lessened by lower temperatures and shorter reaction times. CA *51*, 1628 (1957).

ALCOHOLYSIS in the presence of dioxane under pressure is said to result in up to 70% monoglyceride yield. BP 731,888. HIGH PURITY monoglycerides can be isolated by extractive fractionation with liquid petroleum gas. USP 2,759,954.

IN PREPARING tung oil monoglycerides, McKinney and Goldblatt found that attempts to increase the monoglyceride content usually lead to a loss of unsaturation. The best compromise was by a rapid glycerolysis at 80°C. in pyridine solution with sodium methoxide. The products were effective in lowering surface and interfacial tensions and acted as fugitive emulsifiers. JOCCA *34*, 585 (1957).

MEHTA and Shah indicate that the lower molecular weight coconut oil alcoholizes more rapidly than sesame or linseed oil and that unsaturated acids transesterify slower than saturated acids. JOCCA *34*, 387 (1957).

HARTMAN presented a detailed procedure for the conversion of oils to methyl esters without isolation of the fatty acids. JAOCS *34*, 165 (1957).

Bodied Oils

MILLS bodied tung oil at various stages of hydrogenation. A sample of 160 iodine value oil, containing 20% eleostearic and 30% conjugated diene was equivalent to isomerized linseed oil, while 150 I.V. oil was equivalent to isomerized safflower oil. A maximum of 30% conjugated diene is attainable by hydrogenation. Selective hydrogenation with poisoned catalysts is described. JOCCA *40*, 10 (1957). THE RHEOLOGICAL properties of bodied oils have been studied with a torsion cylinder. Andrade constants were calculated, and the Weissenberg effect was noted in the most viscous oils. Bull. Chem. Soc. Japan *29*, 471 (1956); CA *51*, 3159 (1957).

SIMS reported that the kinetic order of thermal polymerization of nonconjugated oils increases from one to two during the reaction, while conjugated oils maintain second order rates based on monomer disappearance. More than one double bond per mole can be consumed. Intraglyceride reactions at high and low temperatures were also studied. JAOCS *34*, 466 (1957).

HYDROQUINONE has an appreciable polymerization retarding action on the bodying of safflower oil at 300°C. Higher concentrations inhibit isomerization as well. PI *7*, #3, 33 (1957).

Oxidation

HEMINS have been found to accelerate the autoxidation of conjugated oils. Kaufmann and Hambock report that the metal free compounds are catalysts only in photolytic reactions, but drier metal complexes are very effective. Nonconjugated oils are not influenced as greatly. Fette, Seifen, Anstrich. *58*, 520 (1956), METAL ions enhance the activity of hydroperoxide or peracid catalysts for methyl linoleate autoxidation, but do not effect alkyl or acyl peroxides. Kern and Willersin believe that the activity of metallic catalysts does not result from their action with oxygen or the unsaturated compound. Deutsche Farben Z. *10*, 337 (1956).

BANKS, *et al*, presented evidence that the hydroperoxide of conjugated methyl linoleate is a mixture of the 9-hydroperoxy—10,12 diene and the 13-hydroperoxy-9,11 diene. Nature *179*, 1078 (1957).

WITTIG, *et al*, autooxidized ethyl linoleate and separated dimers and trimers by solvent fractionation. Oxygen which was known to be present was not found by end group analysis, suggesting that polymerization had occurred through the oxygen. Since depolymerization by mild reagents took place, the linkage is thought to be a peroxide. JAOCS *34*, 470 (1957).

Isomerized Oils

LINSEED oil has been isomerized by heating with 1-5% anthraquinone at 250-275°C. Improved drying and resistance properties are claimed. PI *5*, #12,21 (1956).

NICKEL catalysts cause migration of double bonds to many positions while selenium only causes elaidinisation. Blekkingh, *et al*, discussed oxidative methods of analysis of isomerized esters. Rec. Trav. Chim. *76*, 35 (1957).

UNSATURATED fatty acid esters isomerized with a nickel catalyst show a double bond migration towards the ester group. No migration occurs with alkalis or other elaidinization catalysts. Ozonization followed by alkaline treatment with silver oxide and chromatography was found to be the best method of analysis. Rec. trav. chim. *76*, 35, 49 (1957).

Derivatives

TROUPE and Aia maleinized fish oil and recommend 5% as the optimum modification for fast, controllable bodying. Increasing the bodying temperature from 504 to 520°F. gave a rate increase of 250%. Inert gas decreases the cooking time and the heat requirements. Curves are presented for heat-viscosity, time-viscosity and acid value-time relationships. Paints from the esterified products show good stability, pigment wetting and low zinc oxide reactivity, and are recommended for rust inhibitive metal primers and paints used at elevated temperatures. OD *29*, 289 (1957). THE TRIESTERS of maleinized oleic or mixed fatty acids are claimed to be as dioetyl phthalate in plasticizing poly (vinyl chloride). They are non-toxic and very heat stable. CA *51*, 8453 (1957).

TEETER, *et al*, prepared Diels-Alder adducts of trans, trans-9,11-octadecadienoic acid with β-nitrostyrene, nitroethylene, methyl vinyl ketone, acetylene dicarboxylic acid, methyl vinyl sulfone and several acrylic derivatives. J. Org. Chem. *22*, 512 (1957).

2,6 DIMETHYL-p-CRESOL reacts with unsaturated oils to yield coumarone type products. The meta derivative forms small amounts of insoluble resinous products. J. Japan Oil Chem. Soc. *5*, 275 (1956).

BLISTER resistance of wood is achieved by treatment with a primer of a polymeric alkoxy titanium carboxylate such as isopropoxy titanium stearate. USP 2,-750,303.

PARACRESOL—formaldheyde adducts react with fish oils and produce products which are presumed to be chromans. The drying properties are superior to linseed oil. CA *51*, 12504 (1957).

CLEMENT obtained unsaturated ketones and ketonic esters from Claisen condensations with fatty acids. Both derivatives dried faster than the parent oils and had better alkali resistance, but yellowed faster. PPV *33*, 711 (1957).

HOFFMANN, *et al*, prepared pure alpha and beta eleostearic acids by mild saponification of the different tung oils and recrystallization from ethanol. JAOCS *34*, 338 (1957).

PARKER and Swern reported yields of 50-60% linolenic acid concentrates by a single urea complex separation at room temperature, JAOCS *34*, 43 (1957).

SYNTHETIC oils can be prepared from long chain unsaturated alcohols and polybasic acids. The Products can be heat bodies. USP 2, 801, 934.

NEW DRYING oil polymers containing no saponifiable ester groups are reported by Von Mikusch and Mebes, who condensed fatty acids to pyrones. PM *27*, 406 (1957).

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INTERMEDIATES

UNQUESTIONABLY one of the most active segments of paint technology is the synthesis of new and improved film formers. By and large the development of new film forming materials has been the result of vigorous research in polymer chemistry in which intermediate chemicals are given special attention.

A major development in 1957 was a new method to produce improved alkyd resins, known as the "high polymer alkyd technique".

This new method is said to yield a greater proportion of high molecular weight alkyd fractions by reacting all the polyol and all the dibasic acid with an initial quantity of fatty acid, esterifying to a low acid number, then adding the remainder of fatty acid and again esterifying to a low acid number.

This technique may be used with any "drying oil" fatty acids but is of greater interest in alkyds made from tall oil fatty acids. It is claimed that long oil alkyds employing tall oil fatty acids which are synthesized by this technique dry in a short time, and thus increase the versatility of the economical raw material.

Another interesting technique is using ethylene glycol and pentaerythritol blends in the manufacture of alkyds. This combination is claimed to help control the functionality of the polyol portion of the alkyd to match the proportions and composition of the monobasic acid portion of the finished alkyd, without compromising the essential technical advantages obtained through the inclusion of neo-pentyl PE structures. Test-fence exposure data indicate the soundness of this approach by some alkyd producers.

Some aspects of alcoholysis reaction in the synthesis of pentaerythritol alkyd were studied and published during the past year. This extensive study examined the deficiencies of the methanol dilution test for completion of the alcoholysis reaction and proposed a test based on the solubility of unreacted pentaerythritol in a mixture of the alcoholysis reaction product in certain solvents. Some conclusions as a result of this study revealed that the rate of alcoholysis of pentaerythritol was found to be connected with the rated it can be dissolved in oil; free fatty acid in the oil used for alcoholysis will inhibit the rate at which the reaction occurs; haze in a litharge-catalyzed alkyd is related to the catalyst concentration and phosphoric acid can be added to the alkyd during esterfication to reduce litharge haze.

There have been several new intermedite chemicals made available to the coatings industry in 1957. These include:-

A high purity dicyclopentadiene which may be combined with a large variety of unsaturated acids and aldehydes in a Diels-Alder reaction.

Alpha-methylstryene monomer for synthesizing styrenated alkyds; also recommended in polyesters and as a copolymer modifier with unsaturated compounds such as butadiene, terpenes, acrylates and vinyl monomers.

Trimethylolphenol has a broad potential use in industrial coatings where it may be used to form new compounds. Its chemical reactivity makes it attractive as a cross linking agent for polymers containing active hydrogen; will react as a one-step phenolic at room temperature, at higher temperatures it will harden rapidly.

A silicone intermediate which can be polymerized with a variety of organic resins.

Hydroxylpropyl glycerine for alkyd and polyester synthesis.

Methallyl chloride can be self polymerized or copolymerized with a variety of reactive monomers.

A resinous polyol (colorless) which has an average of 5-6 primary hydroxyls per molecule and can be esterfied readily with good retention of original polyol color.

Two epoxy compounds, dipentene monoxide and alpha-pinene oxide suggest possibilities as intermediates for coating resins.

INTERMEDIATES

GOURLEY and Dunlop studied the impurities found in technical pentaerythritol. Calcium formate equivalent to 0.005% oxide adversely affects the clarity of alkyds, and linseed oils containing over 0.001% calcium can produce resin cloudiness by themselves. Sodium formate produces no cloudiness, but when the polyol contains as much as 0.2% sodium ash frothing occurs, and as little as 0.05% can increase the alkyd color by one Gardner standard; alcoholysis for four hours without a catalyst results in a better color than a rapid reaction in the presence of sodium salts. Formates reduce the melting point when present in traces and 0.2% causes gas evolution on melting. Sulfates stabilize the heat decomposition of the polyol while formates greatly increase it. Calcium sulfate ends up as discrete insoluble particles which settle and do not affect the clarity of the product. Iron is frequently found, but the concentration must be above 0.2% before a suspension of iron formate and darkening of the resin is found. Barium sulfate and silica have no effect by themselves, but minute amounts of formic or sulfuric acids will produce seedy films if $BaSO_4$ or SiO_2 is present. The color of the pentaerythritol affects alkyd color, but to a much smaller degree than the impurities present in it. No correlation between artificial heat tests (with sulfuric acid or phthalic anhydride) and final alkyd color was found when different sources of the polyol were tested. Formates catalyze alcoholysis when present in larger amounts but are far less efficient than litharge or lithium hydroxide, and only a slight effect on the esterification rate was noted. The particle size had only a small effect on the rate of alcoholysis. Impurities found in normal amounts have no effect on the durability of the resin, and various commercial grades of pentaerythritol showed little ultimate differences in film properties. JOCCA *40*, 247 (1957).

ACROLEIN, acetol, hydracrylaldehyde, diglycerol, glycidol and some polymeric materials have been found among the products of thermal dehydration of glycerol without catalysts. Bull. Soc. Chim. *1956*, 878. WEISS reports that the light absorption of glycerol varies with the water content, and analysis for colored impurities by absorption methods must be modified by dilution to below 72% concentration. CA *50*, 17482 (1956).

MIXTURES of glycols and glycerol have been separated by anion exchange chromatography and dichromate oxidation. Anal. Chim. Acta *16*, 144 (1957). VON RUDLOFF reports that Zeisel methoxyl determinations are always high in the presence of polyhydric alcohols, which give the reaction themselves. Anal. Chim. Acta *16*, 294 (1947).

ARNOLD and Showell describe the reaction of beta pinene with maleic anhydride and other dienophiles. JACS *79*, 419 (1957).

TRIALLYL trimesate has been copolymerized with polyesters. The products are more heat resistant than the styrene analogs. BP 754,537.

MALEIC anhydride can be determined in the presence of other dibasic acids or anhydrides by refluxing with anthracene. The adduct is insoluble in water and does not titrate with aqueous alkali while the others do. The accuracy is within 0.2-0.3%. Chim. e L'Ind. *39*, 17 (1957).

MIXTURES of toluene di-isocyanates can be accurately analyzed by infrared techniques. Lord claims the method has a precision of 0.8%. AC *29*, 497 (1957).

THE USE of tall oil fatty acids in isophthalic alkyd resins was discussed by Carlston. APJ *42*,#1, 50 (1957).

THE PREPARATION and properties of several fluorine containing epoxides has been reported. J. Org. Chem. *21*, 1328 (1957).

MCKELVEY, *et al*, tabulated the properties of gum rosin collected for various sections of the country over an eighteen month period. POCR *120*, #14, 10 (1957).

ADDITIVES

SINCE their introduction some ten years ago, emulsion paints have been a large consumer of paint additives for imparting some particular characteristic to the dried film or the paint itself. As a result, there has been a rash number of these materials, ranging from surface active agents to bacteriacides marketed for latex paints during 1957.

One of the additives offered to the paint industry in 1957, which has generated considerable interest among paint manufacturers is a non-toxic triazine, a self-sanitizing agent for paints. For some time food plant sanitarians, allergists and health authorities have been looking for a paint exhibiting self sanitizing, self disinfecting or microbicidal properties and this anti-pathogenic agent may be the answer. According to the manufacturer of this triazine material, tests indicate that the compound maintains its activity in paints during prolonged liquid storage. Permanency of effect in the paint films has been demonstrated on interior paints six months after application, and after repeated washing of the surfaces. Further evidence of extreme permanency is obtained from paint films subjected to one year exterior exposure wherein self-sanitizing effects were demonstrated with substantially no loss in activity, the producer claims. This sanitizing agent has been tested in butadiene-styrene, acrylic and polyvinyl acetate latex paints, alkyd flat wall paints, and blister resistant paints.

New work with 1,-10 phenanthroline indicates that this additive has possibilities in promoting the drying of modified styrene-butadiene latex paints. This additive has had much success in oleoresinous solvent systems, specifically its drying performance in combination with several drier metals. In the trade it was found that modified styrene-butadiene latex paints are prone to lose scrub resistance as they age in the container. Since most of the formulations contain metallic driers and these driers lose their activity as the paint ages, it was decided to find what effect 1,-10 phenanthrolene had in reactivating the driers. Results indicate that this additive improved markedly the drying and scrub resistance properties of modified styrnene-butadiene systems.

:iers

UELLER and Smith used in-ared and chemical analysis to de-rmine the effect of driers in lin-ed oil and varnish films. Hy-oxyl and/or hydroperoxy, car-nyl, and total oxygen content as greater for varnishes with iers after four months, although differences were found at the ck free time. The most rapid emical changes occur when the lm sets and dries. Most of the xygen remains as carbonyl or hy-roxyl over a two year period and not involved in carbon-oxygen. rosslinking. Linseed oil has the ame hydroxyl content with and without driers, but the total oxygen uptake at the set point is higher without drier. An oil film weight increases 14% and then drops off to a net increase of 1-3%, but a varnish shows a relatively small weight decrease. There is some indication of changes occurring at or near the ester group. Not many structural differences exist between films with high and low drier content, but both differ from films with no drier. IEC *49*, 210 (1957).

FEIGL and Goldstein suggest the p-nitrophenylhydrazone of diacetyl-monoxime as a specific reagent for cobalt. Potassium cyanide prevents interferences from copper and nickel, and the violet complex is identifiable from 0.1 micrograms of cobalt in a dilution of 1 in 500,000. Analyst *81*, 709 (1956). THE COLOR developed by oxidizing manganese (II) with peroxide in the presence of telluric acid is suitable for colorimetric determinations of manganese. Anal. Chem. Acta *16*, 151 (1957).

THE INHIBITION of drying of litho varnishes by phosphates, sul-ates, citrates and other salts is re-orted by Coupe. The phenome-on is caused by metal deactiva-ion either by complexing of the nion itself or by synergistic action ith natural antioxidants. JOCCA *0*, 1013 (1957).

ANKHOLKAR suggests that at oom temperature driers only ac-elerate the decomposition of hydro-eroxides, but at higher tempera-ures they act as electron donors polarizable polyene groups. PI #1, 96 (1957).

STUDY of drier efficiencies in various vehicles showed a cobalt-calcium combination to be equal to cobalt-lead, but cobalt-cerium is inferior in some tung oil varnishes. Manganese and zinc combinations with cobalt are inferior. PI 7, 104 (1957). A REVIEW of drier trends and the mechanism of their action appears in PI *7*, 81 (1957).

DRIERS were surveyed by Morley-Smith with respect to anion differences and method of manufacture. Recent work with barium, zirconium and vanadium is noted. JOCCA *40*, 1035 (1957).

Bacterials

STARKEY determined the decomposition and weight loss of matrix constituents in antifouling paints. The abundance of bacteria in sea water did not correspond to the decomposition. Phenolic resin, alkyd, paraffin and rosin decompositions occur, but ester gums did not. The rate of loss affects liberation of the antifouling substance. Can. J. Microbiol. *3*, 231 (1957).

BUCKMAN and Stitt reviewed the general principles relating to the microbiology of paint films. They make the following recommendations: APJ 41, #39, 80; #40, 89 (1957)

For emulsion paints 1) Preserve raw materials before incorporation into paints. 2) Maintain good housekeeping. Periodically clean lines and equipment with a hot-detergent-preservative mixture, allowing a two hour contact time.

3) Add enough preservative to protect the paint in the can and the film. Protect both undercoat and topcoat.

For oil paints 1) A combination of preservative, zinc oxide, alkalinity and a high chalking rate is necessary in moist temperate zones and tropics. 2) At least two of the above is necessary in the temperate zone. 3) Undercoats need the same protection as topcoats.

STEWART and Klens compared the fungicidal performance of various phenyl mercury compounds and conclude that both laboratory and field tests point to the phenyl mercury content as the only effective portion. Results are not influenced by the acid radical, but from solubility considerations the succinate is preferred in oil paints while the acetate should be used in water paints. APJ *41*, #48, 34 (1957).

A COMPARISON of organomercurials to tributyl tin hydroxide as fungicides and bactericides by Goldberg concludes that the mercurials are more efficient, diffuse more, and are as safe as the tin compound. PM *27*, 436 (1957).

Thickening Agents

ALUMINUM soaps of mixed long and shorter chain saturated fatty acids are more economical gelation agents for solvents than conventional aluminum stearates. USP 2,758,123. PANDE and Mehrotra presented evidence of mono-and di-soaps of aluminum. Mono- and di- isopropoxy laurates and mono-and di- chloride laurates gave low viscosity solutions in benzene. J. Inorg. Nucl. Chem. [illegible], 128 (1957).

LICATA discussed the use of some metallic soaps in the coatings industry. OD *29*, 485 (1957).

SALTS of N-substituted terephthalamic acid were reported by Hotten to be more efficient gelling agents than conventional soaps. IEC *49*, 1691 (1957).

TREATMENT of soy protein with chloracetic acid yields a non-putrefying carboxymethyl derivative useful as a stabilizer for latex paints. USP *2*, 788, 336.

A NOMOGRAPH relating the viscosity of aqueous solutions of methyl cellulose and natural gums to their concentration appears in Chemical Processing *20*, #1, 208 (1957).

PHOTOMICROGRAPHS of mono-disperse latex emulsions show that a protein thickener agglomerates the particles when they are not covered by emulsifier, but that methyl cellulose will not (above a certain low concentration). At sufficient concentrations, methyl cellulose stabilized the latex against electrolytes but soy protein did not. Saunders, *et al,* reported that only a small amount of casein was absorbed on the latex when the surface tension was below the minimum, and that the complex-forming ability of the emulsifier is a factor in determining the distribution of casein between the polymer surface and the water phase. IEC *49*, 1449 (1957).

Surface Active Agents

BASS discussed cationic surfactant uses in the paint field. Pigment wetting, flushing and dispersion, stripping formulations, brush cleaners, germicidal coatings, and improvement of freeze-thaw resistance of latices are suggested. PM *27*, 5 (1957). HOLNESS and Stone outline a program for qualitative analysis for twenty one groups of commercially available anionic surface active agents. Analyst *82*, 166 (1957).

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A BATCH ion exchange technique can be used to separate mixtures of anionic and non-ionic surface active agents. The anionic material is adsorbed on a strong anion exchange resin, while the non-ionic is quantitatively recovered by washing with water and methanol. AC *29*, 1675 (1957).

DU BROW and Dybalski suggested various uses for fatty amines in paints, such as pigment wetting and grinding aids and flushing agents. They impart organophilic properties to pigments and allow the use of higher pigment concentrations. N-coco beta-aminobutyric acid salts impart freeze-thaw stability to latex paints. POCR *120*, #21, 16 (1957).

KRONSTEIN reviewed the uses of lecithin as a dispersing agent. PIM *72*, 10 (1957).

OSIPOW, *et al*, related various theories on the functions of emulsifiers to emulsion stability. JAOCS *34*, 34 (1957).

GUREVICH examined the stabilization of pigment suspensions by various surfactants in solvents of different polarities. The surfactant molecules with a number of active groups became attached to the pigment by only some of these groups, leaving the remainder available for interaction with the solvent. The greater the affinity of of the solvent for the surfactant, the more desorption takes place. PT *21*, 246 (1957).

PRENTISS reviewed the fundamentals relating to pigment packing and the role of dispersants in latex paints. An aggregation test is suggested for comparing the various levels of dispersing agent to determine an optimum level. OD *29*, 951 (1957).

Waxes

JONES surveyed wax polishes and testing methods. PT *21*, 43 (1957).

THE WATER resistance of floor waxes is not due to the volatility of the amine used to neutralize the fatty acid. The loss of amine from the formulation is not related to the volatility of the amine, according to a study by Frump and Riddick. IEC *49*, 65 (1957).

Deodorants

DUNCAN discussed the mechanism of paint deodorant action, drawing and analogy of the neutralization to the action produced by mixing colored lights. Deodorants which destroy odors act by chemical action or adsorption. PT *21*, 204 (1957).

ETHYL p-hydroxy benzoate is reported to prevent odor formed by micro-organisms is casein coatings. Paint, Oil and Colour J. *131*, 1181 (1957).

Miscellaneous

ADDITIVES in general were discussed in articles by Singer, Gardner and Daggett, OD *29*, 26 (1957); APJ *41*, #23,77 (1957). PM 27, 11, 107, 263, 336, (1957)

THE MONTREAL Club summarized various methods which have been suggested to reclaim off quality patches of paint due to livering, flooding, skinning, pinholing, seeding, viscosity variation, slow drying, excessive gloss or foaming. OD *29*, 684 (1957).

THE USE of lanolin in coatings was surveyed by Acaster, who suggests its use as a temporary anti-corrosive coating which is easily removed by solvent. It is a low cost emulsifier and plasticizer for emulsion paints and renders chlorinated rubber paints resistant to cracking and rust. The recent

levelopment of lanolin derivatives s noted. PT *21*, 49 (1957).

SWELLED bentonite has been ecommended to reduce the misting of inks on high speed presses. USP 2,766,127. BARIUM salts of some solubility are claimed to prevent blooming of styrene-butadiene latex paints over freshly plastered surfaces. BP 731,091.

FATTY acid-diamine salts can be added to conventional paints for use over moist or wet metal surfaces, and act as corrosion inhibitors. USP 2,772,174. POLYETHYLENE dispersions added to vinyl chloride-acetate coatings for beer cans decrease flavor changes and iron pick up. USP 2,764,313

CHATFIELD examined the applications of alkyl titanates. Butyl titanate stabilizes aluminum paints, can control foaming and thixotropy, and speeds heat bodying of oil although it has an antioxidant effect. Higher titanates have been used to plasticize urea resins. PM *27*, 25 (1957).

WEISS reviewed the use of aluminum alcoholates and described the utilization of chelated aluminum compounds with vegetable oils. The products can be bodied at low temperatures and improve the drying characteristics of oils. Viscosity stable non-yellowing products are claimed. JOCCA *40*, 863, 976 (1957). THE USE of these synthetic oils in the transformation of marine oils into drying oils is described. OD *29*,995 (1957).

VARIOUSderivativesof2-hydroxybenzophenone with differing solubilities and ultraviolet absorbencies are reported by Weth and and Signore to be useful in nitrocellulose furniture lacquers and clear finishes for plastics. They lead to more durable high visibility fluorescent paints. The opacity of paints to ultraviolets limits their use, but the application of clear topcoats with these agents to retard fading has not been exploited. Transmission curves at varying wavelengths and pH, stability curves, and a comparison of the physical properties of a homologous series of these compounds are given. APJ *42*, #6, 117 (1957).

AMMONIUM zirconyl carbonate is claimed to improve the water resistance of freshly applied emulsion paints and prevent washoff by rain. USP 2, 773, 850.

POLYALKYLENE polyamines such as diethylene triamine or tetramethylene pentamine have been suggested as freeze-thaw stabilizers for latex paints. USP 2, 802. 799

PRODUCTION

TECHNOLOGICAL improvements in paint manufacture, particularly in mixing and dispersion methods, were noted in 1957.

A new development in dispersion and grinding using the "sand grinder" was described in late 1957. The sand grinder is a relatively small and inexpensive piece of machinery cylindrical in shape which disperses pigments by means of a rapidly agitated mass of sand (ASTM 20-30 mesh).

Pigments and media are premixed and a volume of fine sand equal to that of the pigments is incorporated.

The machine consists of a series of small flat discs mounted horizontally on a vertical shaft. This shaft rotates at a high speed within an upright pipe and thus produces regions of extreme turbulence. In these areas, mechanical pressure is developed between the sand grains and the particles of pigment, agglomerates are dispersed and even individual crystals of the suspended matter are crushed. The cylinder is jacketed to provide a temperature between 120 and 150 degrees F. Screens are fitted at the outlet of the milll to allow the dispersed pigment to pass out but keep the sand in.

Special features of this mill are: it can be adapted to continuous production; has high rate of production; brighter and cleaner colors with reduced tendency to chalking can be produced; power requirements are small; quiet operation; and no further attention is necessary after appropriate setting has been made.

Automation in the paint industry has made substantial progress over the past year. This has been particularly true of material handling techniques where weighing and metering of materials can be completely instrumentized. In vehicle and varnish manufacture, the use of instrumentation to control temperature, viscosity, etc., has been refined.

Among the important developments in machinery for paint manufacture made available to the paint industry during 1957 are:—

A double planetary changeable can mixers which have reduced stirrer clearances and improved angle of approach of stirrer to each other as well as against side of can to break down and disperse lumps and agglomerates.

Two large size production dissolvers with increased mixing power is claimed to handle a wide variety of mixing and dispersing problems.

Mixer-disperser unit is claimed to insure good wetting action, improved color dispersion and uniform blending of batch requiring no further processing.

High speed mixer is said to disperse, deagglomerate, dissolve and emulsify pigments in a paint base.

Split-level mixers designed to handle high density, high viscosity chemicals are available in 50, 350, 750 and 900 gallon sizes.

Dispersion-mill, particularly adaptable for emulsion paints, is said to reduce paint mixing time by 98 percent.

PRODUCTION

THE TREATMENT of waste from a paint and dye plant has been studied. After the dye wastes were segregated, the remainder was coagulated by alum at an acid pH to get the best compaction of sludge. The dye waste was successfully treated with activated carbon, chlorination, or by biological oxidation. CA *51*, 8449 (1957).

EDWARDS classified mixtures as to state of matter and state of each phase (continuous or disperse), and discussed mixing techniques for each case in continuous or batch operations. JOCCA *40*, 200 (1957). THE ENERGY consumption of paddle stirrers has been studied, and can be related to the Reynolds numbers when the containers are not baffled. Genie Chim. *76*, 185 (1956).

KEW described the construction, operation and formulation aspects of the Kady Kinetic dispersion mill. JOCCA *40*, 643 (1957).

FRIEDMAN detailed the use of an Eppenbach homo-mixer in paint production, eliminating pre-mixing and effecting a 30% saving in mixing time. PVP *47*, #13, 48 (1957).

PEARCE surveyed the principles of grinding. Dispersion, wetting and disintegration were discussed in relation to various types of mills, emphasizing ball mills. OD *29*, 526 (1957). BAKER and Virtue present curves of fineness vs. time, time vs. oversize, film thickness vs. contrast ratio, and cost vs. milling time to a given contrast ratio in considering the factors affecting the economic optimum milling time. Hiding power is governed to a large degree by mill time, but the operation can be carried beyond an economic return. From data at different points in the milling cycle with respect to film thickness and hiding power, an optimum balance point for a given formulation can be found. OD *29*, 178 (1957).

ARCURI made a mathematical study of the relation between speed of a ball mill and its diameter for optimum efficiency and reported it to be inversely proportional to to the square root of the diameter. CA *51*, 10139 (1957). KAUFMANN compared operating results for high speed stone mills with triple roll and ball mills. FL *63*, 395 (1957). TAYLOR and Zettlemoyer presented theoretical principles relating particle size and production rate for a three roll mill. Formulas are given to predict the performance of a given mill. PM *27*, #7, 299 (1957). AN EMPIRICAL mathematical approach towards calculating the proper pigment-vehicle ratio for premix bases with various pieces of equipment was worked out by Taylor, in an effort to reduce trial and error runs. PIM *72*, #7, 8 (1957).

USED lift trucks are discussed by Moody. A four to five year old reconditioned truck has a life expectancy of 60-70% of a new one, while a three to four year old one can be expected to have 75-85% of its normal usage remaining. A factory rebuilt machine with a warranty has 90% of the life of a new model, but costs only 30-40% of the new one. A check list of conditions to be examined in selecting the proper type and condition of used and new machines covers the nineteen points under discussion in tabular form. PVP *47*, #4, 45 (1957).

BESKINE recommended a solid scale model as an aid to studying improvements in materials handling. Davis reviewed the principles of fluid handling in discussing the most advantageous use of equipment for production. Scott suggested equipment and layout for a paint laboratory. PM *27*, 173, 209 (1957).

MANKIN described positive displacement metering of liquids operating on fluid pressure. The meter fills and empties a measuring chamber, counting the number of cycles. Installation, trouble shooting and testing are discussed. PVP *47*, #2, 31 (1957). THE NEW YORK production club presented two useful types of batch tickets. One uses a duplicating device and the other does not, but both eliminate copying and are useful where a variety of products are manufactured. The first is useful in a large company where many copies are needed for different departments, while the second requires no capital layout for a duplicating machine. OD *29*, 386 (1957).

INSTRUMENTATION in the paint and varnish industry was the subject of a series of papers. Process control instruments, automatic material handling, color measurement, rheological instruments and automation were surveyed. PVP *47*, #11, 39 (1957). AN AUTOMATIC temperature control for ball mills has been described. PIM *72*, #3, 80 (1957).

ACID resistant concrete has been recommended for the storage of oils and fats. The acid value decreases because of neutralization by alkaline substances in the concrete, and the container strength was increased when oleic acid was added to sunflower oil. CA *51*, 1627 (1957).

THE DUTIES of a plant manager have been outlined. OD *29*, 1018 (1957).

PASTEELNICK and Leder showed how statistical analysis was applied to a process development problem in polymerization. PVP *47*, #8, 57). (1957)

THE ENGINEERING aspects of emulsion polymerization are discussed by Baum. IEC *49*, 1797 (1957). A CONTINUOUS recycle method for copolymerization enables the production of copoly-

mers of predictable, homogeneous composition. IEC *49*, 1803 (1957). USP 2, 795, 332 describes a pressure filter apparatus for paints and varnishes comprised of a tubular annulus of pleated paper impregnated with a phenolic resin.

BUCHANAN discussed toxic hazards in the paint industry. Volatiles are most dangerous as most can cause dermatitis and narcosis when inhaled, and some are systematic poisons. Benzene is particularly bad in this respect as it acts on the bone marrow. The incidence of lead poisoning is low today. Extenders can cause fibrosis of the lungs when inhaled in quantity, but driers are not used in sufficient quantity or under conditions likely to cause poisoning. Incompletely polymerized resins can cause dermatitis. JOCCA *40*, 337 (1957). KNAP, *et al*, discussed the special techniques for safe handling of the alkyl aluminum compounds which are becoming industrially important as catalysts for polymerizations. IEC *49*, 874 (1957).

NO TOXIC hazards exist in the use of rooms painted with an antifungal mercurial paint. At 0.1% combined mercury in the wet paint yielding five micrograms of mercury per square centimeter of finished area, all the paint which might flake off a 20 sq. cm. area could be safely consumed daily by a human without exceeding the upper safe limit for mercury. CA *51*, 18639 (1957). A SYMPOSIUM on safety covered catalysts, dust explosions, compressed gases and solvent-air mixture monitoring. IEC *49*, 1727 (1957).

FRENCH presented a survey of current federal, state and municipal labelling laws and regulaions. APJ *42*, #6, 56 (1957).

CHEMISTRY
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ANALYSIS
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TESTING

TESTING and quality control go hand in hand. As new demands are made upon the coating industry, testing becomes an important factor in the successful application of the coating materials.

Thus, instrumentation has gained in stature in the paint laboratory particularly the use of improved color measuring devices making it possible for greater control of color uniformity. By the same token, infra-red and ultra-violet spectrophotometers, flame photometry, X-ray diffraction and gas chromatography are being used to a greater extent by the coatings industry.

In reviewing some of the highlights in paint testing during 1957, one must look at the record of Committee D-1 (ASTM) on Paint, Varnish, Lacquer and Related Materials. This group has continued its progress in developing accurate test methods. Among its accomplishments during 1957 in the form of tentative test methods include: total rosin acids content of vehicles; test for gas checking of varnishes; color differences using the Color Eye; and test for the Knoop Indentation hardness of coatings; revision of tentative methods—temperature change resistance of clear nitrocellulose lacquer films; tinting strength of white pigments; advancement of tenatives to standard methods—degree of blistering of paints; effect of household staining agents on nitrocellulose lacquer films.

D-1 has added a new subcommittee on Statistical Application. This sub-committee will review the adequacy of statistical procedures used in existing test methods, as well as to recommend statistical methods for sampling, designing experiments and presenting data.

Committee D-1 is working on a variety of test procedures too numerous to mention here. They range from glazing compounds to emulsion paints. The work of this committee is the backbone of the paint industry's test methods, and it works closely with the Federation of Paint and Varnish Production Clubs and the National Paint, Varnish and Lacquer Association to insure the paint industry of adequate testing procedures at all times.

CHEMISTRY

WENNING classified polymerizations according to conditions, type of emulsifier, and initiator used. Polymerizations with soluble and insoluble solid emulsifiers result in two and three phase emulsions, but dissolved initiators do not change the number of phases. With solid initiators, polymerization is transferred to the surface layers. The colloidal chemistry of stereospecific polymerizations is discussed in detail. Makromol. Chem. *22*, 81 (1957). BAKER and Williams described a chromatographic procedure which can be used to fractionate polymers. The polymer is equilibrated between a moving solution and a stationary precipitated phase along a column and simulates a continuous series of filter beds over a range of temperatures. JCS *1956*, 2352. HANNA derived equations for rapid calculation of the amount of monomer to be added at any stage of a free radical batch copolymerization between monomers of different reactivity to yield a chemically uniform polymer. IEC *49*, 208 (1957).

MULTICOMPONENT copolymer systems were investigated by Slocombe. Terpolymer systems which form two azeotropic copolymers frequently give clear terpolymers when the composition of monomer charge is chosen from a line joining the azeotropic compositions on a triangular plot. Systems taken from either two styrenes and one methacrylate, or two methacrylates and one styrene are unusual in that clear terpolymers were obtained from all combinations. High compatibility resulting in clear films was shown by copolymers with compositions along the azeotropic line, while incompatibility is found with polymers not on the line, and compatibility decreased as the distance between these compositions increased. Forty-four terpolymer systems are reported. JPS *26*, 9 (1957).

POLYMERIZATION of vinyl monomers has been initiated at low temperatures by trialkyl borons. The reaction is anionic and since triethyl boron is insoluble in water, suspension polymerization is possible. JPS *26*, 235 (1957).

IN THE COPOLYMERIZATION of acrylonitrile and other relatively water soluble monomers the copolymer composition is independent of the emulsifier concentration. Monomer-polymer composition curves are similar to those from bulk polymerizations when the composition of the oil phase of the emulsion is used for monomer concentration. With water insoluble monomers, emulsion copolymers contain less acrylonitrile as the amount of emulsifier increases. Copolymer compositions were identical to bulk runs only when the critical micelle concentration was used. Emulsion free aqueous copolymers contained mors acrylonitrile than bulk resins. CA *51*, 15995 (1957).

NATTA, *et al*, have described a new type of polymer designated "steroblock" polymers. These are linear derivatives of alpha olefins where different portions of the chain have different steric configurations, and differ from ordinary block polymers because only one monomer is present. CA *51*, 12536 (1957). GAYLORD reviewed methods for the preparation of graft polymers. Interchemical Review, *15*, 91 (1956).

HIDING POWER can be calculated from photometric measurements only, without measurement of film thickness. Mitton applied the Kubelka-Munk two constant theory of light scattering to the problem. If the scattering coefficient is known from independent measurements, the hiding power can be calculated from photometric measurements according to the derived equations. Several methods are given to approximate the necessary constants. OD *29*, 188 (1957). THE AUTHOR also described a simple method for computing the increase in hiding power of a white paint for a decrease in reflectance value. A graphical method and an arithmetical method are derived from application of the Kubelka-Munk theory. OD *29*, 251 (1957).

EVESON reported on the rheological properties of stable suspensions of very small spheres at low shear rates. Newtonian behavior is associated with increased dispersion, and a lattice work structure of flocced particles forms when a non-Newtonian suspension is allowed to stand undisturbed. The degree of compaction and the continuity of the structure decreases, and the time required to reform after shear increases as the degree of dispersion increases. With a controlled increase in dispersion, a number of rheological states are attained until Newtonian behavior is reached. For a given zeta potential, flocculation occurs if the average distribution is below a critical value; this distribution decreases with an increasing zeta potential. Conductivity measurements are not good for measurement of the degree of dispersion. The relative viscosity of a stable Newtonian suspension is independent of particle diameter for spheres over 15 microns, while it increases with decreasing diameter of smaller particles. JOCCA *40*, 456 (1957).

DINTENFASS developed formulas relating sedimentation volume to the ratio of suspension viscosity/vehicle viscosity for Newtonian systems. Similar relationships exist between the viscosity ratio and hydrodynamical volume of the pigment phase in thixotropic or flocculated suspensions. Chem. and Ind. *1957*, 141.

O'NEILL and Cole discussed applications of infrared spectroscopy to the chemistry of drying oils, curing of epoxys and the identification of synthetic resins. J. Appl. Chem. *6*, 399 (1957). THE GELATION of alkyds has been examined from the standpoint of kinetics, in a Japanese article. CA *51*, 6207 (1957).

A MATHEMATICAL treatment of gelation in polycondensations having like groups of unequal reactivity has been derived by Case. The inclusion of unsymmetrical reactants significantly increases the degree of polymerization necessary for gelation. Treatments of systems with anhydrides and mixtures of acids and glycols are included. JPS *26*, 333 (1957).

BURRELL considers the wrinkling of films. Thick skins and coarse wrinkles are promoted by a high modulus of elasticity which delays

wrinkling until a thick skin can be built up, use of a resin allowing a low monomer concentration in the surface, a slow rate of polymerization which allows a build-up throughout the film, pre-polymerization which reduces gel-monomer swelling, and a long air dry before baking. Wrinkling progresses rapidly when it starts. As the surface skin continues to polymerize, the tendency to wrinkle increases to a point and then decreases. Very soluble resins inhibit wrinkling. Org. Fin. *17*, #7, 13 (1956); Interchem. Rev. *15*, #1, 3 (1956).

MECHANICAL shear can produce a decrease in the molecular weight of a resin. The degradation occurs only with the highest molecular weight molecules and only above a minimum concentration of these. J. Phys. Chem. *61*, 418 (1957).

MARSHALL studied the effects of four different types of radiation (ultra-violet through infrared) on different film formers. Shorter wavelengths increase the toughness by cross-linking while longer wavelengths increase the brittleness from cross-linking with scission and volatilization. Oxygen is the primary source of degradation, which is accelerated by exitation of the molecules by light and heat. While olefinic unsaturation is the primary base for attack, the phenolic hydroxyl is also a vulnerable spot. Tensile strength and infrared results are discussed. OD *29*, 792 (1957).

A RUSSIAN article related the adhesion of various polymers on a cellophane substrate to the molecular weight. For polyisobutylene, a maximum occurs at 20,000. With butadiene and its copolymers, adhesion increases as the number of side chains decreases, and improved when the amount of acrylonitrile in the resin was lowered. CA *51*, 15991 (1957). IN STUDYING polyacrylates, polyvinyl acetals and polyvinyl ethers, Eich and Haarlammert found that the adhesion increases with lengthening of the side chain. Possible explanations are presented. FL *62*, 581 (1956).

IN A SYMPOSIUM on catalytic processes relating to the surface coatings industry, Eley reviewed the cationic polymerization of vinyl ethers and Dainton discussed ionizing radiations and their use in polymer chemistry. Rushman considered the basic concepts relating to reaction rates in varnish technology and illustrated the position of catalysts by the chemistry of the anthraquinone acceleration of oil conjugation and dimerization. Akroyd described several uses of iodine as a positive or negative catalyst. Bond discussed several reactions of hydrocarbon radicals on metal surfaces. JOCCA *40*, 810, 895 (1957).

METHYL ethyl ketone peroxide has the same efficiency as benzoyl peroxide in solvent polymerizations of styrene or methyl acrylate, but has an intermediate ability for chain transfer. JPS *25*, 333 (1957).

THE ELECTROKINETIC properties of paints were studied in an attempt to relate this property to permeability. All substances tested were negatively charged, and on generalization can be made. CA *51*, 10923 (1957).

ANALYSIS

HUMMEL discussed the use of the potassium bromide pelleting technique for infrared identification of wire lacquers. Reference spectra are given for a number of different resins. FL *62*, 529 (1956). BAK reviewed the use of infrared spectroscopy in oil chemistry. Farg och Lack *3*, 12 (1957).

WIBERLEY, *et al*, describe the use of an internal standard for the quantitative analysis of solids via infrared techniques. The analysis of poly (vinyl chloride)—poly (vinyl acetate) copolymers and of free fatty acids in aluminum soaps are given as examples. AC *29*, 210 (1957).

AZEOTROPIC distillation has been used to separate and determine the composition of polyhydric alcohol mixtures. AC *29*, 100 (1957). KAPPELMEIER refluxed alkyds with 2-phenyl ethylamine. Pentaerythritol crystallizes from the hot solution when chloroform is added and trimethylolethane on cooling; the filtrate contains trimethylolpropane and glycerol, which can be determined with periodate. Verfkroniek *30*, #3, 48 (1957). THINIUS and Schroeder saponified resins with ethanolamine and separated the polyols by ion exchange. Chem. Tech. *8*, 395 (1956).

THE ANALYSIS of polyesters for polyol content is rapidly accomplished by descending paper chromatography with saturated n-butanol. Impurities do not affect the R_F values, and the analysis can be carried out on the crude saponification extract. Chem. Prumysl *32*, 212 (1957).

TAWN and May presented an extensive report on the paper chromatography of polyols and dibasic acids in alkyd resin analysis. The paper tabulates R values with glycerine and phthalic anhydride taken as standards. The results of various detection tests and a scheme for the analysis of 100 mg. of alkyd resin is shown. The authors suggest the use of standard office photostat machine to make permanent records of chromatograms. JOCCA *40*, 528 (1957).

A RAPID control method for phthalic anhydride in alkyds is to saponify with alcoholic potassium hydroxide, add excess standard acid and extract the fatty acids with chloroform. Brink then titrates the aqueous layer with base. The method yields results slightly higher than gravimetric procedures, is non specific and not applicable to resins attacked by alkali. JOCCA *40*, 361 (1957).

SWANN uses the formation of the highly colored quinizarin from phthalic anhydride and hydroquinone as a basis for a microcolorimetric method for ortho phthalates. AC *29*, 1352 (1957). MIXTURES of adipic, sebacic and phthalic acids were separated by adsorption on a silica column and elution with butanol-chloroform. J. Appl. Chem. *7*, 328 (1957).

CHROMATOGRAPHIC determination of fatty acids in paint analysis has been evaluated by Lichthardt. Development as the copper salts and treatment with ferrocyanide is recommended, and a comparison with standards is necessary. Deut. Farben—Z. *11*, 387 (1957). POTENTIOMETRIC titration by sodium ethoxide in an anhydrous closed system can be

used to determine terminal carboxylic residues in saturated and unsaturated polyesters. MC *23*, 60 (1957).

A rapid potentiometric method has been reported for the determination of small amounts of unreacted isocyanates in a lacquer or film surface. CA *51*, 8585 (1957).

HYDROPEROXIDES, peracids, and hydrogen peroxide can be titrated potentiometrically with sodium aminoethoxide in ethylene diamine. The potential at half-neutralization can be correlated to the acid strength and structure of the peroxide. AC *29*, 79 (1957).

TWO colorimetric methods have been reported for the quantitative determination of organic peroxides. Angew. Chem. *68*, 352 (1956).

KUBITZ tests qualitatively for traces of isocyanate in urethane polymers by reaction with the secondary amine derived from malachite green and n-butyl amine. By reaction with excess butyl amine and determining the excess colorimetrically with malachite green the method becomes quantitative. AC *29*, 814 (1957).

AN alumina column has been used to separate mercury dithizonate from excess reagent, permitting a simple colorimetric determination for mercury. Analyst *82*, 203 (1957).

COPPER and mercury can be determined in a mixture by complexometric titration. AC *29*, 1668 (1957). A NEW RAPID titration method for lead uses a high frequency oscillator to detect the end point of a chromate precipitation. AC *29*, 1688 (1957). THE COMPLEXOMETRIC titration of zinc and barium in a mixture forms the basis for a rapid estimation of lithopone without separation of the constituents. PM *27*, 384 (1957).

KAPPELMEIER'S saponification method for the oil content of varnishes has been modified so that only oils and alkyds are saponified completely, leaving other hard resins. The "brittle resin" is then calculated as the unsaponifiable matter plus non-esterified resin acids. Verfkroniek *30*, 10 (1957).

KAUFMANN describes an apparatus for graphically recording the weight changes of thin films on drying. Fette, Seifen Anstrich. *58*, 844 (1956).

BAUR points out the use of dielectric constant measurements in raw material and paint analysis. FL *63*, 284 (1957).

POLYVINYL acetal resins may be identified by liberating the aldehyde with acid (or by dry heating, if unmodified) and identifying the polyvinyl alcohol by the blue color with iodine in potassium iodide. The color test on an unhydrolyzed sample can indicate the degree of acetalization. Zambrini discusses the limitations of the test. Pitt. e Ver. *13*, 51 (1957).

LASKO presented a carbon replica technique for the examination of paint surfaces by electron microscopy. By coating the film with methyl cellulose, stripping by lifting off with tape, vacuum coating the methyl cellulose with carbon, dissolving the cellulosic with water and shadowing the carbon with chromium, the original surface is left unchanged and organic solvent techniques are avoided. Carbon is more stable than silica or plastic in an electron beam and the carbon films can be handled without additional backing or screen supports. AC *29*, 784 (1957).

DIFFERENTIAL ebulliometry is claimed to give experimental errors of 3-6% when applied to various polycondensates of low molecular weights (300-10,000). Duskova used the method on novolaks, alkyds, polyesters, epoxys and polystyrene. Chem. Prumysl *7*, 102 (1957).

HASLAM and Squirrell describe the applications of automatic titrimeters, including nitrogen and chlorine analysis in polymers, determination of water, iron, aluminum, and carbonyl contaminants in monomers. Analyst *82*, 511 (1957).

BECAUSE HYDROLYZABLE materials or compounds of high buffer action interfere with acid titrations for epoxy groups, Stenmark recommends an argentimetric titration of chloride. AC *29*, 1367 (1957). ALPHA epoxides containing a tertiary carbon atom cannot be determined by conventional methods, but catalytic isomerization with zinc bromide isomerizes them to aldehydes which can be estimated gravimetrically as the dinitrophenylhydrazones. AC *29*, 1666 (1957).

NITROCELLUSOSE can be rapidly estimated by reacting it with alkali in the the presence of acetone and measuring the absorbance at 425 mμ. Swann reports that only certain rosin products and phenolics interfere. AC *29*, 1504 (1957). The anthrone reagent can be used to determine cellulose esters and ethers other then nitrocellulose. Some knowledge of the type of resin is necessary. AC *29*, 1505 (1957).

THE CONCENTRATION of urea-formaldehyde resins has been determined by refractometry. Formaldehyde solutions can be analyzed to within 0.5%, and the method can be used to follow a polymerization. CA *51*, 4046 (1957). MELAMINE-formaldehyde resins in combination with alkyds, epoxys, or other resins can be determined gravimetrically after an acid hydrolysis in dioxane. Swann and Esposito suggest factors to convert the insoluble hydrolyzate to melamine or melamine-formaldehyde resin content. AC *29*, 1361 (1957).

BOTH MOISTURE and water of crystallization in some solids can be determined by azeotropic distillation if different hydrocarbons are used. AC *29*, 1694 (1957).

MIDDLETON described a method for preparing microscope slides of emulsions without altering the shape or splitting the globules of the disperse phase. Analyst *82*, 289 (1957).

PRIMARY amines in fatty amine acetates have been determined colorimetrically by reaction with salicylaldehyde to yield the yellow Schiff base. AC *29*, 1502 (1957).

THE SEPARATION and estimation of saturated acids in natural fats is described by Spickett, *et al.* A high recovery is claimed. Chem. and Ind. *1957*, 734.

A SPECIAL flask with a viewing arm has been suggested by Kukin for the determination of acid values of dark colored oils. Results are comparable in precision to potentiometric analyses. AC *29*, 461 (1957).

TESTING

PATTON designed a pigment settling gage and a paint sag tester. The first consists of a perforated

plate which is loaded with weights at specific time intervals. A plot of loading vs. depth of descent of the plate will show different curves for cases of no settling, incipient settling or hard settling and will give an indication of thixotropy. The apparatus has been used to test antisettling additives. The second instrument consists of a pair of metal legs which draw uniform 1/32 and 5/32 inch lines across a wet film. Comparative pictures demonstrate ratings of the sag resistance of paints, depending on flow over the two bare areas. OD *29*, 10 (1957).

BY STRETCHING a sheet of tetrafluorethylene over an aluminum plate Cass provided a smooth substrate for preparing free films. A five mil sheet was carefully selected to have a minimum of longitudinal die marks. Films can be baked right on the support and frame. Cellulose tape is used to remove any traces of old film which may remain, but films over 1.5 mils thick usually strip freely without tearing. OD *29*, 240 (1957).

TRANSPARENT replicas of surfaces made with polyvinyl alcohol and shadowed with aluminum were used by Jellis and Williamson to study surface defects. The replicas can be shadowed, mounted and photomicrographed in thirty minutes after stripping. JOCCA *40*, 684 (1957). FISCHER and Hamann presented twenty one electron micrographs of paint films, illustrating the relation between gloss, pigment dispersion and flow during drying. The utility of the electron microscope in studying the effects of short weathering times is emphasized. FL *63*, 209 (1957). KAUFMANN and Gulinsky described the technique for preparing thin paint films for transmission electron microscopy. Crystalline areas in linseed oil films have been found from waxes and fatty acids, which may account for blooming. Deut. Farben—Z *11*, 188 (1957).

STOLOW described a non destructive apparatus for measuring film thickness based on the flow of a gas through the space formed by the tip of a cut off hypodermic needle and a given surface. J. Sci. Instr. *33*, 333 (1956).

AGREEMENT between tensile tests for extensibility and cylindrical mandrel bending tests is reported by Recchia. No agreement was found with a conical mandrel or with multicoat films. Pitt. e Ver. *12*, 833 (1956).

RENKEN describes the measurement of film thickness by eddy currents set up in an alternating current probe coil. ASTM Bull. *220*, 8 (1957).

MILNER determined hiding power by applying films of known thickness to an acrylate sheet and measuring the reflectance over black and white areas. Extrapolation to 0.98 contrast ratio gives the thickness needed for coverage and hiding power can be calculated. CA *51*, 10087 (1957).

MUNK derives the two constant theory relating the hiding power of a paint and shows its experimental validity. Deut. Farben—Z. *11*, 84 (1957); PM *27*, 217 (1957).

FUCHSLOCHER considered methods for measuring adhesion of paint films. Ultracentrifuge and ultrasonic methods are superior, but satisfactory results are claimed for simpler impulse methods. Deutsche Farben Z. *11*, #2, 63 (1957). MAY, *et al*, applied coatings to the front end of a bullet fired at a steel target plate. The deceleration produces a normal force at the film substrate interface, and by varying the velocity of the bullet, a force of 2000 lb./sq/in. can be obtained. Adhesion measurements are reproducible to 10% and agree with other methods. Nature *179*, 494 (1957).

THE ADHESION of a film to porous substrates can be measured by placing the specimen over an orifiice and determining the amount of air pressure needed to lift the film. USP 2,799,156. BY MOUNTING the knife of an adherometer on a metal beam, Roberts and Pizer were able to measure and electronically integrate the elastic deformations to give an average value. ASTM Bull. *221*, 53 (1957). A TEST for the inflammability of materials subjects one face of a panel to electric heat and uses pilot flames to ignite gases from the exposed or unexposed faces. PPV *32*, 983 (1957).

BY SHEARING thin films between parallel steel plates Humphreys and Stone rapidly dissipated frictional heat and were able to measure viscosities in the range of 10^4-10^7 poises. J. Sci. Instr. *34*, 26 (1957).

WILLIAMS and Wright discussed the errors and accuracy of colorimetry. The Donaldson and Colormaster instruments agree for most specimens but differed slightly from the G. E. instrument. The highest discrimination only results from comparison of two panels with similar reflectance curves. Interlaboratory tests showed good agreement among several instruments. Nature *179*, 179, 180 (1957). HISDAL described some necessary changes in the methods for color measurement of daylight fluorescent materials. Optica Acta *3*, 139 (1956).

MEASUREMENTS of color matching with a Beckman photoelectric spectrophotometer equipped with a reflectance attachment have a precision of about 0.3 NBS units on light colors and lower precisions on dark or saturated colors. Tilleard compared results with color matchers' acceptances and claimed that the instrument can give useful results at its highest precision, but its discrimination is not sufficient to distinguish the smallest differences perceptible under the best conditions except for near-whites. JOCCA *40*, 952 (1957). SEAVALL demonstrated the fundamentals of the C.I.E. system and the applications of color measurement in a study of the yellowing of dry and wet standards on storage. JOCCA *40*, 87 (1957).

ATHERTON and Tough described the representation of pigments. JOCCA *40*, 115 (1957).

SPECTROPHOTOMETRIC applications in the paint industry were summarized by Lawrence. APJ *42*, #16, 64 (1957). INSTRUMENTAL color reproduction of paints was discussed in OD *29*, 1062 (1957); APJ *42*, #7C, 26 (1957). ASTM work in progress on color difference measurement was reported by Ingle. APJ *41*, #46, 82 (1957).

HESS commented on some personal experiences with the ISCC color aptitude test. JOCCA *40*, 136 (1957). ANY SOURCE of light can be successfully used to match color when the pigments present are similar in composition,

but multiple light sources are necessary when the pigments are metameric. THE PHILADELPHIA Club recommends matching under 7500° Kelvin and verifying at 2800°K. Illumination brighter than 150 foot candles induces too much eye fatigue if used for long periods. OD *29*, 1153 (1957); APJ *42*, #7C, 22 (1957).

HUNTER recommended improvements in glossmeters. J. Opt. Soc. Amer. *47*, 118 (1957). NIMEROFF reviewed two parameter methods for describing the gloss of clear finishes. J. Res. Nat. Bur. Standards *58*, 127 (1957).

BY DRAWING the fumes from a luminous gas flame through a cooling condenser into a desiccator test chamber, Phillips was able to keep samples at a uniform temperature and obtain reproducible gas checking results. Evidence points to the formation of beta-eleostearin as the substance in tung oil responsible for gas checking, catalyzed by ozone. Moisture enhances the effect and at temperatures where no condensation occurs, there is little gas checking. A temperature of 40°C. accelerates the effect, but if the film sets in a relatively short time no checking occurs. As the concentration of oxidizing gases increases, isomerization increases, yielding the trans isomers which react faster to produce the checking effect. JOCCA *40*, 271 (1957).

A SIMPLE technique for following the reaction of epoxy resins is to cure the polymer between two potassium bromide discs and follow its infrared spectrum. Feazel and Verchot compared the activities of diamine curing agents by this method. JPS *25*, 351 (1957).

BLOCH reviewed needs and developments in artificial aging test chamber testing compared to natural field tests, especially under extreme conditions. APJ *41*, #14 (1956); #18, 98 (1957). DIFFERENT weather variables and their effect on paint exposures were discussed by Gordon. PIM *72*, #6 (1957). A SIMPLE test for the blister resistance of house paints is suggested by Andrews. A painted wooden disc securely taped over a partially filled glass of water will blister when the glass is heated. PIM *72*, #3, 82 (1957). PANEL experiences with the assessment of light fastness were reported by Gillan. JOCCA *40*, 129 (1957).

THE KANSAS city Production Club suggests the examination of sagging from the edge of a ten mil drawging from the edge of a ten mil drawdown. Results are said to correlate well with practical experience. OD *29*, 1086 (1957); APJ *42*, #7C, 24 (1957).

A MODIFICATION of the method for testing the scrubbability of flat wall paints measures the change in reflectance of the film after wet abrasion on a straight line apparatus. OD *29*, 1094 (1957); APJ *42*, #7C, 18 (1957).

MOORE and Jenness describe a rolling ball method for the determination of film drying. By determining the coefficient of rolling friction, the film can be followed through its increasing viscosity and then its degree of tack to a final hardness. PIM *72*, #1, 16 (1957). SNOW criticizes the traditional methods of paint testing because they involve a complex of physical properties rather than a fundamental physical measurement. Curves of a Shore hardness tester applied to films of various viscosities are presented. OD *29*, 907 (1957).

A SIMPLE brush drying device spins out solvents by use of an electric motor rotating at 2000 R. P. M. Brushes are dry within ten seconds. JOCCA *40*, 704 (1957).

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ARCHITECTURAL FINISHES

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INDUSTRIAL FINISHES

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APPLICATION

NUMEROUS types of paints and finishes, each having special characteristics were introduced last year.

To describe all of these developments is beyond the scope of this discussion. However, there are a few unique types worth mentioning here.

Considerable interest was noted in antiseptic coatings for application to objects which are used by the public but rarely washed. These include telphone hand sets, toilet seats, flush levers, door knobs, etc.

Heat-reflective or "cool" paints based on an acrylic emulsion and special white pigments is said to be effective in protecting surfaces from the sun such as oil and gasoline tanks, roofs of box-cars, exterior of buses, barns, sheet metal buildings, etc.

A thermosetting acrylic finish having properties resembling porcelain was offered in 1957. This finish has marked improvement in color and gloss retention plus good resistance to chemicals, detergents and grease.

A gloss, vinyl-emulsion machine enamel was also announced during the past year.

Two new primers were made available to the automotive industry. One was based on an epoxy vehicle and the other in the form of styrene-butadiene emulsion system.

A brushless wood finish appealing to the do-it-yourself market is described as a combination lacquer and varnish which produces a transparent coating on wood and is available in a variety of colors. Application is made by cloth.

Other important coating developments include a high visibility paint for exterior use; gold lacquer based on half-second butyrate; a neutral gray paint for use in color testing; an aluminum strippable coating which protects metal products during storage and shipping; and a organic based coating which resists fuming nitric acid.

ARCHITECTURAL FINISHES

FISK discusses the causes of blistering of paint films from the viewpoint of substrate, type of blistering, adhesion measurements, etc. Intercoat adhesion loss is more frequent than loss of adhesion to the substrate, and the more highly functional vehicles present the major problems. PT *21*, 39 (1957). AT HIGHER temperatures free films of linseed oil paints were found to absorb more water and lose more soluble material. Browne reported that higher curing temperatures reduce absorption and swelling of films, and films that were soaked and dried through fifteen alternate cycles still absorb water, swell and lose soluble material. Forest Prod. J. *6*, 453 (1956).

DATA was also presented on the flow of air, water and moisture through various paints. Forest Prod. J. *7*, 145 (1957).

RISCHBIETH and Bussell studied the paint holding (durability) properties of Australian woods. A variation in density of the wood has no effect but a great variability was found between panels. Quater sawn wood is generally better than back sawn. American wood controls were Western red cedar, Northern white pine, and Southern white pine as examples of very good, intermediate, and poor woods.

JOCCA *40*, 306 (1957). LESLIE, *et al*, discuss the discoloration problem encountered with the recent rise in the use of cedar shakes. It is not due to the migration of water alone, but is associated with capillary travel of natural oils in the wood and is more pronounced in darker colors. The color can be removed with 50% alcohol or sometimes with soap and water. They recommend:

1) Avoid using stained panels, as the trouble already exists at the surface.
2) Paint as soon as possible to keep the oils at a maximum depth. A good two coat system is needed, and a factory applied low cost sealer should be disregarded.
3) There is some indication that the type and amount of zinc oxide have a great influence on the staining. Proper pigmentation needs to be studied in detail.
4) Since blistering is not a problem in shake construction, a tighter film of the non-breathing type may be more suitable.

MERZ presented an extensive review of varnish testing techniques. Deutsche Farben Z. *11*, 1 (1957).

SPECTOR, *et al*, discussed efflorescence on brick, stucco and masonry surfaces and suggest proper venting of walls, extra venting for dryers and other special sources of high humidity, a vapor barrier inside paint and silicone treatment or emulsion paint on the outside as preventative measures. Paint Logic *28*,#5, 22 (1956).

SYNTHETIC resin emulsion paints do not improve the flame spread characteristics of building boards. Hird and Wraight report that pigmentation in general had little effect, but mica greatly improved vinyl acetate paints in this respect. Trichloroethylphosphate plasticizer and combinations of antimony oxide with chlorinated diphenyl were also found useful. PT *20*, 274 (1956).

A NUMBER of test methods for evaluating dry spackling compounds were examined by the New York Production Club. All attempts were found to be highly operator dependent. OD *29*, 1102 (1957); APJ *42*, #7B, 29 (1957).

KAUFMANN and Gulinsky report that a fast drier combination such as cobalt-lead causes no change in the drying of oil films at different humidities. With intermediate strength driers (cobalt-manganese-zinc) humidity is important at low temperatures, but with weak driers (cobalt-zinc, or lead alone) drying depends to a large extent on the relative humidity. Deut. Farben-Z. *11*, 90 (1957).

SHELLAC and other penetrating floor sealers were discussed in short papers by Bohnert and Hartman. OD *29*, 1024, 1028 (1957).

A SYMPOSIUM on exterior house paints discusses blistering, low luster paints and standard house paints, pointing out the advantages of zinc pigments. OD *29*, 836 (1957).

HIBBERD compared emulsion paints to a conventional house paint on wood. An alkyd emulsion over a white lead primer most nearly approached the performance of the standard, while polystyrene and styrene-butadiene paints were unsatisfactory. Vinyl acetate paints had the best appearance, and the pigmentation of these paints is discussed with regard to clean up. Zinc sulfide is unsuitable as the sole pigment in an emulsion paint. Verf. *30*, 155 (1957). IN COLORED emulsion paints, fading is reduced by using a chalk resistant rutile at a reduced pigment volume, but when the chalking becomes considerable, organic pigments fade. This type of paint retains dirt. For self cleaning paints, organic pigments are unsuitable and the type of titanium dioxide must be selected on the basis of climate and air pollution problems. Verf. *30*, 165 (1957). DETAILED data on the outdoor exposure of acrylic emulsion paints is presented by Allyn. PVP *47*, #6, 39; #7, 37 (1957).

SEVERAL papers discussed the current status of work towards gloss finishes from polyvinyl acetate and alkyd emulsions. APJ *42*, #2, 50, 78, 106 (1957).

FILMS deposited from solution show little deterioration under ultraviolet except when reactive vinyl groups are present. Kronstein reported that films from emulsions show more deterioration and the amount varies with pigmentation. Combinations of the two systems are less sensitive to pigmentation and radiation than the films from straight water emulsions. PVP *47*, #7, 25 (1957).

ACCORDING to Stieg, the hiding power of pigments should be examined by curves showing hiding power in square feet per gallon of solids as a function of pigment volume concentration. The figures indicate a maximum of hiding from straight titanium dioxides at 30 PVC. Curves of cost versus hiding power are also shown and it is possible to calculate the maximum hiding power per dollar as a function of pigment volume. OD *29*, 439 (1957). IN STUDYING the hiding power of pigments and

pigment mixtures Saunders used contrast value plots. Pigments should be compared at the same concentration in the paint rather than in the film. Nitrocellulose and urea-epoxy resins show an unexplained rise in hiding at high pigment concentrations. Numerous curves are presented for pigments, extenders, and various mixtures of pigments. JOCCA *40*, 643 (1957). JAMES contends that the loss of opacity of a paint on drying is due to the rise of the vehicle's refractive index on solvent evaporation. The point is disputed by Stieg and others. JOCCA *40*, 786, 794, 884, 990, (1957).

INDUSTRIAL FINISHES

Anticorrosive

THE NACE presented detailed information on application, physical properties, resistance to exposure, flammability classification, storage life, temperature limitations and other data for twenty two different types of coatings for the protection of steel in rural, industrial and marine atmospheres. Corrosion *13*, #3, 85 (1957). RUST described problems involving painting of a chemical plant in the subtropical marine environment of the Texas Gulf Coast. Corrosion Tech. *3*, #5, 134; #6, 185 (1956).

THE APPLICATION of coatings to steel sheets at the time of fabrication prevents corrosion before final finishing can take place. Laubscher and Larrabee find that the corrosion resistance of a coating is better over clean steel than over weathered and wire brushed steel. More applications of vinyl coated steel laminates can be expected, as severe forming applications are possible. PVP *47*, #9, 35 (1957).

MAYNE surveyed current views on how paints prevent corrosion. The presence of soluble salts such as ferrous sulfate, which varies with the time of year in an industrial atmosphere, greatly changes weathering characteristics, as ions may decrease the electrical resistance of the film by diffusing into it. In films of high electrical resistance absorbed water is distributed as isolated droplets and the uptake of water from a solution decreases as the concentration of electrolyte increases, possibly due to the lowered vapor pressure of the droplets and the attainment of osmotic equilibrium. The resistance of a linseed oil film follows the solution resistance, indicating that the system is under the control of ion penetration. The absorbed water is finely dispersed. There is an endosmotic transfer of water in low resistance films, but water movement cannot be detected electrically with films of high resistance. Low resistance films may have a capillary structure, or the films might be altered by the application of high voltage used for tests. JOCCA *40*, 183 (1957). TARBOURIECH suggests an accelerated test of alternate thirty minute cycles of −15°C., steam, sulfur dioxide, and moist ultraviolet for rust inhibitive paints. By following weight changes with time, the utility of pigments and vehicles may be rated. PPV *32*, 506 (1956).

IN A SYMPOSIUM on anticorrosive pigments, several British authors discussed practical paint experiences with calcium plumbate, metallic lead, zinc tetroxychromate and zinc dust. Manufacture, formulation and corrosion mechanisms are discussed and photographs of

exposures are presented. OD *29*, 751 (1957).

A NUMBER of rust inhibitor additives have been tested in primer paints. Not all of the tested compounds acted in the same manner in all primers and some were actually deleterious. Most of the additives increased the drying time of the paints. A thick paint film containing anticorrosive pigment is a necessity for prolonged exposure, although additives can upgrade a film for a shorter period. OD *29*, 1077 (1957).

A COMBINATION of magnesium vanadate and barium potassium chromate inhibits the galvanic corrosion of magnesium coupled with aluminum alloys. Corrosion *13*, #9, 76 (1957).

A DISCUSSION of proposed corrosion research for the Federation appears in OD *29*, 694 (1957).

Miscellaneous

HEATING phosphated coatings in the absence of air causes a loss of water of hydration decreasing their volume and causing voids, which can explain their loss of corrosion resistance. Zinc phosphates are affected at 300°F. while manganese phosphates go at 400°. Doss explains that the satisfactory use of these treatments is due to the fact that, under normal finishing conditions, the steel and phosphate coating under a paint does not attain 300°C. Org. Fin. *17*, #8,6 (1956).

MICROSCOPIC examination of etch-primer films by Coleman and Wells shows marked Benard cell formation shortly after application. The dried films had a rough texture with a network of deep fissures which is responsible for the coupling to topcoats. JOCCA *40*, 1051 (1957).

BERGER measured the permeability, porosity and swelling rate of several film formers in hydrochloric acid. Permeability increases with increasing acidity, but decreases when sodium chloride was used as an electrolyte. Permeability is reduced by an application of multiple coats. Deut. Farben Z. *10*, 211 (1956). DE AND RAO discuss the three types of permeability affecting paint films (ionic, water and oxygen) and point out that ionic permeability does not always follow water-vapor data. J. Sci. Ind. Res. *15B*, 413 (1956).

RADIOACTIVE tracer techniques have been applied to the study of adhesion of aircraft paints. No adhering fatty acid monolayer was found after a weathered primer was stripped before refinishing. Neither the stripping process nor the presence of aluminum stearate in a primer affected the adhesion of a new coat to a stripped surface, but use of a wash primer prior to a zinc chromate primer improves the adhesion, according to Glass and Pellegrini. OD *29*, 49 (1957). FALKOWITZ and Gottfried found that tricresyl phosphate was a poor plasticizer for aircraft lacquers. Short coconut alkyds show the best gloss retention and no advantages were noted by addition of a melamine resin or an ultraviolet absorber. A paint manufacturer should retain control over the individual pigments rather than purchase a composite which has been blended for color. OD *29*, 243 (1957).

CHISHOLM and Rudd reviewed progress in corrosion prevention in naval aircraft. Pigmented silicone resins are recommended for cast magnesium and its alloys. A vapor phase inhibitor is more effective than an oil mixture in protecting engines from cylinder wall corrosion. Corrosion *13*, #7, *69* (1957).

COBURN discussed fire retardant paints and the problems found by the railroads with treated timbers. APJ *41*,#3, 75 (1957). NEITHER silicones, silicone alkyds, modified varnishes, ceramic enamels, nor chemical treatment were found suitable as heat resistant finishes for automobile mufflers. ASTIA Doc. 1954, #48087.

POLLINI reported that gas checking is more severe with higher ratios of ozone to nitric oxide. Gaseous products from a film in ozone containing air were acidic. Highly esterified epoxy resins gas check more readily than those of lower ester content, and with styrenated alkyds the tendency decreases with increased styrene until it disappears at 40% modification. Pitt. e Ver. *13*, 109 (1957).

STUBBINGS shows pictures of the border effect in antifouling paints, where the area adjacent to the antifouling paint gets some protection from the leaching action. The reverse effect can also be noted, where the coating is diluted of its poisonous layer so that microorganism settlement is not inhibited. For these reasons, multiple strip testing on the same panel is not recommended. JOCCA *40*, 350 (1957).

COATED ANODES designed to expose an increasing surface with time result in a considerable saving in anode material and a reduction in damage to the paint film on a cathodically protected ship bottom, according to Van Der Hoeven. JOCCA *40*, 667 (1957).

QUILLATRE classifies insulating varnishes into six groups depending on their heat resisting ability and describes the principle types and their applications. PPV *33*, 333 (1957). LONG chain 2-alkyl guanamines decrease the blocking tendencies of hot melt paper coatings. USP 2,764,509. MOLYBDENUM disilicide suspended in a phenolic vehicle and baked out at 3900°F. leaves a dense, adherent glaze on graphite suitable for high temperature uses. PB 121084, 1954. HIGH visibility paints made with a fluorescent red-orange pigment in various vehicles were examined. Noonan and Cowling found better durability with soy alkyds, silicone-alkyd, and silicone-phenolic vehicles than with lacquers of several types, and that a topcoat containing an ultraviolet absorber doubled the life of the paint. Report of Naval Research Lab. Progress, Sept. 1956, 6. TREMAIN and Morris considered advantages, limitations and formulation of single coat multicolor finishes. PT *21*, 83 (1957). LLOYD discussed modern processing techniques during the coating operations on automobile bodies. JOCCA *40*, 433 (1957).

LINSEED oil dries more rapidly on a lead substrate than on glass and an appreciable loss of lead from the substrate is found. Iron, chromium, nickel, aluminum and stainless steel substrates show slight acceleration of drying but copper and brass retard the rate. Tung oil dries slower on lead, but dehydrated castor and tobacco seed oils act like linseed. PI *7*, 102 (1957).

CARRICK recommended chlorinated paraffin coatings when good adhesion to paraffin wax is needed. Some solvent restrictions are necessary to provide rapid evaporation and minimum penetration into the substrate. POCR *120*, #8, 14 (1957).

STRIPPABLE coatings have been made from dilute solutions of sodium carboxy-methyl cellulose containing an aryl alkyl sulfonate. German P. 955, 127.

PLATH presented colored photomicrographs of microtome sections from defective lacquered wood surfaces. Dye staining contrasts different components, and faults in the glue, veneer or filler are shown to affect the lacquer. FL *63*, 334 (1957).

APPLICATION

COLEMAN and Wells report six case histories of paint complaints investigated by British government agencies, using microscopic, visual, and chemical analysis. The most common faults were found to be poor surface preparation or painting under adverse conditions. JOCCA *40*, 365 (1957). GEYER reviewed general practices used in cleaning methods and prepainting treatments for metal surfaces. OD *29*, 533 (1957). AN ACID solution containing chromates, chlorides, and complex fluorides is recommended for ferrous surfaces. USP 2,762,731. AIKEN and Garnett discuss the use of ethylene-diamine tetra-acetic acid and other chelating agents in metal cleaning and derusting. Electroplating and Metal Fin. *10*, #2, 31 (1957).

OSAMU described a simple tester to determine the case of atomization of paints by electrostatic spraying. This property is more closely related to the polarity and molecular structure than to conductivity, dielectric constant or surface tension. Non-polar substances are poor in atomization. CA *51*, 2305 (1957). BREWER discussed the distribution pattern of electrostatically applied coatings from frictional electrification. Changing the solvent changes the amount and charge of frictional electrification generated on agitation, and it is possible to formulate for the desired properties. OD *29*, 44 (1957).

IN POLYCHROMATIC paints the metallic effect is more evenly distributed when electrification is at a minimum. The equipment for measurement of electrification is described. PVP *47*, #8 (1957).

BEDE recommends a mixture of 80% fast solvents and 20% slow solvents for airless spraying. The amount of solvent governs film thickness while the type controls flow and orange peel. Hot spray formulations are usually unsuitable for airless application. PM *27*, 71 (1957). FORNWALL explained the DeVilbiss spray apparatus for catalyzed finishes, where the two materials are mixed in the spray pattern after they leave the gum. The ratio can be controlled through multiple regulators and flow meters. Capacity-viscosity curves to determine the catalyst flow are presented. PVP *47*, #4, 51 (1957). A DESCRIPTION of currently available valve types for aerosol packages appears in POCR *120*, #16, 14 (1957).

AN AIRLESS method of spraying circulates hot water through two pipes of a triple bore hose to maintain the paint in the third channel at elevated temperatures. Surfaces ten feet from the spray nozzle have been finished with flat paints from this apparatus. Org. Fin. *18*, #6, 4 (1957).

KRUPP discussed the baking of finishes by radiant heat. POCR *120*, #15, 10 (1957). ABSORPTION curves for urea, phenolic and alkyd resins show absorption in the 1-2 micron range. Nedey found that paint films attain lower temperatures as the infrared reflectance increases, and the time for hardening is proportional to the reflectance. This does not hold for furnace baking where conduction and convection occur. PPV *32*, 1085 (1956). RADIANT heat can cure resin/paper combinations very rapidly without degradation of the paper, according to Stannett, *et al.* TAPPI *39*, 234 (1956).

BERKELEY, *et al*, discuss the use of activators in methylene chloride stripping solutions. Formic acid is more effective than acetic acid. Amines are soluble while caustic alkalis do not form compatible solutions. Alkyl celluloses provide higher viscosities with methanol-methylene chloride mixtures than does cellulose acetate. Paraffin wax, scale wax, and a beeswax derivative show promise as evaporation retarders. The effect of co-solvents on evaporation was determined. CA *51*, 737 (1957).

A LABORATORY device for reproducible dip coating depends on the lowering of a container with a simple hydraulic damping device. Watkins also described convenient inexpensive panel holders for brushing or spraying. PM *27*, 55 (1957).

SUBJECT INDEX

AUTHORS' INDEX

BUYERS' GUIDE SECTION

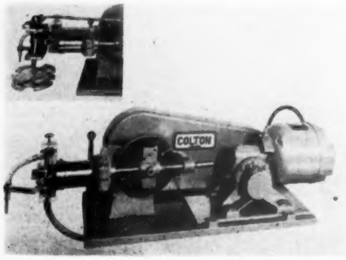
While every effort has been made to assure the completeness and accuracy of the listings in this Buyers' Guide, the publishers of Paint and Varnish Production cannot guarantee against omissions or errors and assume no responsibility for such.

Readers and manufacturers are invited to suggest additions or changes for next year's edition which will be published in March, 1959.

1957

MATERIALS & EQUIPMENT DIGEST

This section contains a compilation of new materials and equipment introduced in 1957. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



COLTON

LIQUID FILLERS
High-Speed Type

New "Little Giant" single and twin-nozzle models have been added to the Colton "100 Series" line of liquid fillers. These models are claimed to make available for the first time features of high-speed, volumetric filling in a low-cost, compact, bench-type machine.

Multiple liquid fillers are equipped with patented metering cylinder and valve assemble, which includes an adjustable suck-back control The control is said to permit high-speed volumetric filling to accuracies within less than one percent variation.

Among materials that can be handled by the new filler are paints and related oil products. Arthur Colton Co., Dept. PVP, 3400 East Lafayette, Detroit 7, Mich.

HIGH-CAPACITY V-BELT
For Multi-Belt Installations

The new "Powerflex Hi-Capacity V-belt" is reported to have a strength of 40 per cent more than that of standard belts. It is thus claimed to reduce belt failure on multi-V-belt installations to a minimum and to lower drive costs, since fewer belts and narrower sheaves are required.

Featuring a special oil resistant cover to prolong its life, the new belt can also be furnished with static conducting covers. A and B section belts are manufactured with nylon laminated construction. D and E sections are of heavy rayon grommet construction. Thermoid Co., Dept. PVP, 200 Whitehead Rd., Trenton, N. J.

HOT PLATE
With Magnetic Stirrer

The "Fisher Thermix," a new double-duty laboratory apparatus, combines a 700-watt heater and magnetic stirrer for a host of routine stirring, mixing and dissolving operations. A continuously variable bi-metallic thermostat for top-plate heating control is employed.

FISHER

In the "Thermix,," the stirrer motor is insulated from the ceramic-supported hot-plate with what is described as "an air-aluminum-asbestos-aluminum-air heat barrier." Furthermore, a Fiberglas extension keeps heat from travelling along the motor shaft.

Manufacturer reports that copper-jacketed heating elements are cast directly into the aluminum top-plate. Hot-plate and stirrer are designed to operate either independently or simultaneously. Fisher Scientific Co., Dept. PVP, 717 Forbes St., Pittsburgh 19, Pa.

ALIPHATIC AMINES
Long Chain Type

"Armeens O and OD," two new long chain amines, are reported to be highly unsaturated. According to the manufacturer, because of this high unsaturation, the cationic chemicals have a low solidification point and excellent solubulity in almost all common organic solvents except the glycols.

Both new amines are produced in easy to handle liquid form, for use in corrosion inhibition, quaternary production, adhesion improvers, and chemical intermediates. Chemical Division, Armour and Company, Dept. PVP, 1355 W. 31 St., Chicago, Ill.

LIFT TRUCK
2,000 lbs. Capacity

The new "Hyster 20 Lift Truck, Model QC," with optional job attachments and LP-Gas installations, is designed to lift a 2,000 lbs. capacity. The lift truck comes equipped with pneumatic tires. One of the special job attachments for use with the "Hyster 20' is a "Load-Grab" clamp, to permit the handling of loads by hydraulically actuated arms, which grip difficult to handle objects from the side.

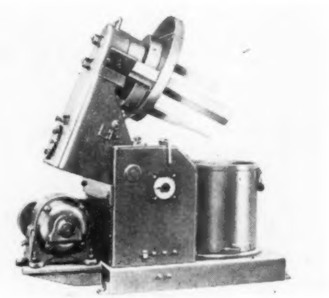
HYSTER

Manufacturer states that the LP-Gas equipment on the truck is UL approved. The LP-Gas operation is said to give increased engine life, longer oil and oil filter life, lower fuel costs and reduction of exhaust fumes. Hyster Co., Dept. PVP, 2902 N.E. Clackamas St., Portland 8, Ore.

DOUBLE PADDLE MIXER
For Small Batch Work

An 8-gallon capacity double paddle mixer, described as suitable for small batch work in mixing paints, chemicals and inks, has just been introduced. It is claimed to be strong enough to withstand strains imposed by heavy mixes.

In the mixer, a 2 hp motor powers blades and can table in a close-coupled drive arrangement. A hand tilting device to lift the paddles is balanced and pivoted for raising and lowering ease. The can cover is integral with the head, and lifts out of the way when the head is raised. The Cincinnati Hildebrand Co., Dept. PVP, 3410 Beekman St., Cincinnati 23, Ohio.



HILDEBRAND

EPOXY COMPOUNDS
For Use As Intermediates

Two new epoxy compounds, dipentene monoxide and alpha-pinene oxide, are now available in experimental quantities. Both are suggested for use as intermediates in the manufacture of protective coatings, adhesives and plasticizers; as reactants in organic synthesis, and as solvents.

Dipentene monoxide is said to combine the reactivity of any epoxy group with that of an olefinic double bond in a cyclic terpene molecule. Alpha-pinene oxide is claimed to combine the reactivity of an epoxy group with that of the bicyclic system of alpha-pinene.

In the presence of a trace of acid, alpha-pinene oxide rearranges in aqueous media to give mainly sobrerol, while under anhydrous conditions campholenic aldehyde is the main product. Becco Chemical Division, Food Machinery and Chemical Corp., Dept. PVP, Buffalo, N. Y.

P-BASE MOTORS
For Vertical Pumping

A new line of protected, vertical, solid shaft, P-base motors for all vertical pump installations has been introduced. The new motors, with normal thrust bearings in all sizes from 1 to 40 horsepower and high thrust in sizes from 1 to 15 horsepower, are available in a protected, totally-enclosed, or explosion-proof enclosures.

According to the manufacturer, all of the new P-base motors are corrosion-proof for long, safe operation under adverse conditions as are frequently found in the process industries. Company states that the standard enclosure for its explosion-proof, P-base motors meets Underwriters' Laboratories specifications. Reliance Electric and Engineering Co., Dept. PVP, 1088 Ivanhoe Rd., Cleveland 10, Ohio.

FILTER CARTRIDGE
Made of White Cellulose

A new 5-micron filter cartridge made of white cellulose, bonded with a totally inert resin, has been introduced. Called "White Micro-Klean," the cartridge is recommended for filtration problems where fluid polishing to extreme clarity is required with no contamination of fluid.

The new cartridge fits most standard filter housings wherein string-wound cotton filters have generally been employed. Successful applications of the new filter, thus far, include filtration of fine enamels, clear lacquers, wax, and methanol. The Cuno Engineering Corp., Dept. PVP, Mereden, Conn.

VISCOMETER RECORDERS
New Model Series

Company announces a new line of viscometer recorders called the "Model R3 Series." "Model R30" is for recording only, while Models "R31," "R32" and "R33" contain one, two or three adjustable switch points respectively.

The last three units will take care of all electric on-off two-position and three-position control, operating motors, motor starters or solenoid valves. These models can also be used for alarms and signals of all types.

The series also includes "Model R3P," providing a 3-15 lb. output air pressure which is a function of viscosity. This model can be used with other pneumatic equipment to provide automatic control. Norcross Corp., Dept.PVP, 247 Newtonville Ave., Newton 58, Mass.

PVA EMULSION
High Water Resistance

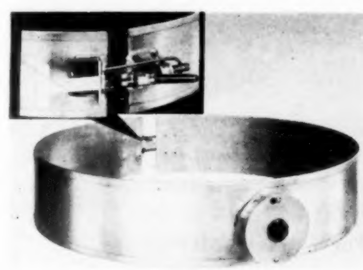
A new polyvinyl acetate emulsion with high water resistance, trade-named "Elvacet 84-1100," is designed primarily for use as a vehicle in water-base paints where stability and high water resistance offer important advantages.

Company says "Elvacet" can be used in either exterior masonry paints or interior paints. E. I. Du Pont de Nemours & Company, Inc., Dept. PVP, Wilmington 98, Del.

PUMP GREASE
Resists Solvents

Company announces an entirely new type of grease made especially to overcome the problem of lubricating pumps which are used to handle solvents. The new solvent resistant grease is said to be impervious to the washing action of almost all petroleum and chlorinated solvents.

Futher recommendations for the new lubricant are held to be that it remains relatively unchanged in use and that it may be pumped readily in a hand grease gun at extremely low temperatures. Pennsylvania Refining Co., Dept. PVP, 2686 LisbonRd., Cleveland 4, Ohio.



ACRA

DRUM HEATER
Electrical Type

A new electrical drum heater is said to provide improved conduction for heating standard 55 gallon steel drums. Known as the "RH-1 Acrawatt," the new model is designed for 22¼" diameter drums containing materials such as plastic resins, oils, adhesives and non-volatile chemicals which require

heating to facilitate removal from the container.

Features of the new heater include a new quick-action toggle clamp, built-in three heat switch and wiring circuits said to assure uniform heating at any one of three settings. At high setting, the heater is available in capacities of either 3000 Watts—230 volts or 2500 Watts—115 volts. Acra Electric Corp., Dept. PVP, 9909 Pacific Ave., Franklin Park, Ill.

AMINE-FATTY ACID
For Thickening Solutions

"Monamine # 7-70," a compounded amine-fatty acid condensate is reported to possess unusual thickening characteristics. Company recommends it for use in pigment grinding and in the manufacture of latex paints.

According to the manufacturer, solutions of the "Monamine" fatty amide in distilled water are clear, while in tap water they are slightly hazy. A 10 per cent solution of "Monamine # 7-70" in water is said to produce a viscous liquid. A four percent solution is held to set up a slow flowing gel with rubbery consistency. Mona Industries, Inc. Dept. PVP, Paterson 4, N. J.

MORSE

CRADLE TRUCK
For Safe Drum Handling

A new cradle truck for handling barrels or drums features specially designed curved top rails which hold the containers firmly in position and prevent dangerous tipping.

Other safety features include non-skid devices, located directly forward of the front wheels on the rocker, and a safety catch on the nose piece. These prevent the barrels from sliding during loading. Ruggedly built, the truck has an 18-inch wheel base. It is available with four large 3-inch diameter wheels placed on a straight axle. Morse Manufacturing Co., Inc., Dept. PVP, 727 West Manlius St., East Syracuse, N. Y.

pH METER
Push Button Type

Company announces the new "Zeromatic" pH meter, a line-operated instrument which features automatic correction for electronic zero drift and rapid push button control.

The "Zeromatic" has a 0 to 14 pH scale range and two millivolt ranges: 700-0-700 millivolt range and the extended 0 to 1400 millivolt range. The extended range is said to be particularly useful for oxidation-reduction titrations.

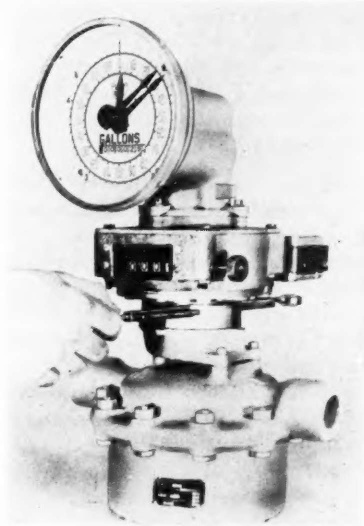
In the new instrument, operator reading error is minimized with a mirror-backed scale which eliminates paralax. Scientific Instruments Division, Beckman Instruments, Inc., Dept. PVP, 2500 Fullerton Rd., Fullerton, Calif.

BECKMAN

LIQUID METERING SYSTEM
With Explosion-Proof Design

A new explosion-proof control system for industrial liquid metering provides an accessory control switch, a predetermining register and latch box and quantity control valve—all installed at the meter. Upon completion of a predetermined liquid delivery, a switch is automatically thrown, opening an electrical circuit and cutting off simultaneously all liquid flow at the meter and all pumping action.

Where repeated deliveries of a fixed amount of liquid are required, a special factory-set predetermining register is available. This saves time on fixed-volume deliveries, by eliminating resetting of the register after each run. Meter and valve Division, Rockwell Manufacturing Co., Dept. PVP, 400 No. Lexington Ave., Pittsburgh 8, Pa.



ROCKWELL

ALKYD RESIN EMULSION
Is Solvent-Free

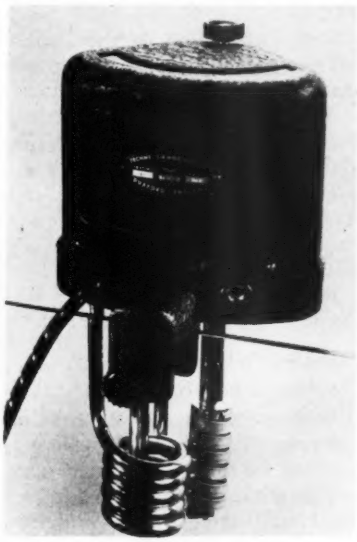
Fire hazards, solvent odors and toxic fumes are said to be eliminated with "Rezamul 1504," a newly-developed, solvent-free paint vehicle. Initial investigations have been confined to industrial applications of air-drying and baking aqueous enamels. Company claims however, the new emulsion will also prove adaptable to various other end uses.

Manufacturer reports that "Rezamul 1504" may be thinned merely by the addition of water, that it has no flash point or objectionable odor, and that it possesses excellent mechanical and thermal stability. Finishes made with "Rezamul" as the sole vehicle are described as exhibiting excellent gloss, together with good film integrity and durability. Reichhold Chemicals, Inc., Dept. PVP, White Plains, N. Y.

HEATER & STIRRER
For Water Baths

The "Tempunit," a new apparatus for operating laboratory water baths, combines a self-contained heater, controller, stirrer, and circulator with a completely built-in pneumatic control system sensitive within $\pm 0.05°$ C. Compact in construction, the unit measures only 10 inches in overall length and weighs only 5½ pounds.

In the "Tempunit," a bimetallic helical temperature-sensing element operates a pneumatic capsule, which receives its air supply through suction from the 6-bladed stirrer. Suction produced by the the stirrer also enables the "Tempunit" to circulate 1 liter per minute to external instruments such as refractometers and viscosimeters while closely controlling an uninsulated 4-gallon water bath. Arthur S. LaPine & Co., Dept. PVP, 6001 South Knox Ave., Chicago 29, Ill.

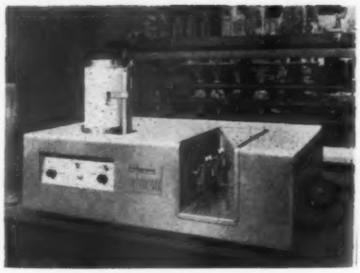


LaPINE

GLASS BEADS
Reflective & Free Flowing

Manufacturer of reflective glass beads for highway markers and signs claims that its new Free Flowing Glass Beads will store for an unlimited period without lumping up in storage. It is said that the beads feature a marked resistance to high humidity and consequent reduction in maintenance costs.

Time is saved by use of the new beads, according to the company, since it is no longer necessary to clean dispensing equipment at the end of the day. Additionally, beads reportedly may be left in the hopper overnight, eliminating the necessity of screening and drying out prior to use. Flex-O-Lite Manufacturing Corp., Dept. PVP, 8301 Flex-O-Lite Dr., St. Louis 23, Mo.



PERKIN-ELMER

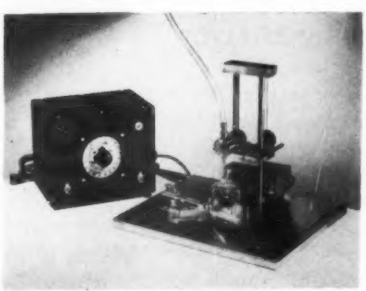
SPECTROPHOTOMETER
Double-Beam, Infrared Type

Company announces the "Infracord Spectrophotometer" as a new low-cost, double-beam, infrared instrument for use by the organic chemist at his bench. According to the manufacturer, the analytical instrument which sells for less than $5,000 will provide considerable versatility.

The spectrophotometer, reportedly, may be used for fast purity checks of raw materials, for recording the progress of an organic synthesis, for molecular structure elucidation and for precise quantitative analysis. Perkin-Elmer Corp., Dept. PVP, Norwalk, Conn.

LIQUID FILLER
Is Semi-Automatic

A versatile, new, semi-automatic liquid filler is designed for efficient short or long runs in filling small bottles and containers. The fill is controlled by a timed flow. Timer is adjustable to 1/60th of a second.



NORTH AMERICAN

Features reported for the filler are that it is easily portable, sets up easily in a few minutes and is adaptable to almost any size opening. Position of the valve-spout assembly is claimed to be adjustable up and down or backward and forward.

According to the manufacturer, the filler takes only two square feet of table space. It can be gravity fed or pressure fed. North American Electric Corp., Dept. PVP, 1713 So. Halsted St., Chicago 8, Ill.

STAINLESS FAUCET
For Dispensing Solvents

An improved corrosion-resistant faucet, "Model U-008," has been made available for dispensing corrosive and inflammable fluids in the chemical industries. Fabricated of stainless steel throughout, the unit is reported to have the approval of The Factory Mutual Engineering Division of Factory Mutual Laboratories.

ECONOMY

In the design and construction of the new faucet, metal to metal contact has been eliminated by the introduction of Kel-F fluorocarbon seal rings. Additionally, an anti-flash screen is said to successfully prevent propagation of any flames which might enter the storage drum through the spout.

The new faucet can be disassembled for cleaning, and because of materials of construction, can be chemically and/or steam sterilized. Economy Faucet Co., Dept. PVP, 12 New York Ave., Newark 1, N.J.

PLASTIC TAPE
In All Shapes

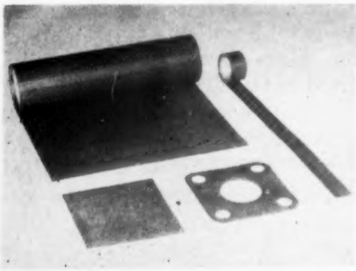
A plastic tape said to combine best elements of fiberglass and Teflon has been developed.

Claimed to be highly resistant to chemicals, solvents and temperature extremes, with good insulation characteristics and high

degree of dimensional stability and mechanical strength.

Product, named Korda-Flex, is available in tapes, sheets and rolls, and in belts, pads or other shapes produced by die cutting, heat welding or stitching.

Chicago Gasket Co., Dept. PVP, 1271 West North Ave., Chicago 22, Ill.



CHICAGO GASKET

WATER SOLUBLE RESIN
For Water Paints

A new water soluble resin, DM-HF (Dimthyl Hydantoin Formaldehyde), may be used for water paints, for temporary metal coatings, for lining drums or rubber hoses which carry corrosive liquids, and in binders for pigments, inks and abrasives.

The new substance is described as water-white and practically odorless, with a melting range of 59-80° C. It is said to dissolve rapidly in water, in all proportions, to give solutions of low viscosity. A 10 per cent water solution is almost neutral.

Other solubility data reported states that DMHF is soluble in methanol, ethanol, ethyl acetate and methylethyl ketone. It is insoluble in benzene and petroleum ether.

The resin is compatible in various concentrations with glycols, urethane, "Carbowax", polyvinyl alcohol, neutralized polyacrylic acid, sodium carboxy methyl cellulose, casein and zein. Glyco Products Co., Inc., Dept. PVP, Empire State Bldg., New York 1, N. Y.

PLASTICIZER
For Pigment Grinding

A high-molecular-weight polymeric plasticizer for dispersions and pigment grinding is being introduced.

Product is said to permit easy processing on conventional equipment. Claimed to provide all the extreme permanence characteristics of high-molecular-weight polymerics, as well as excellent electrical properties.

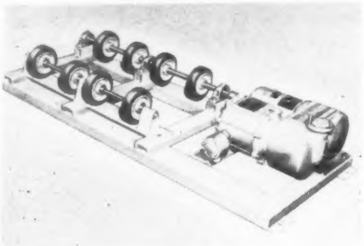
Information and booklet titled "Emery 3049-S Polymeric Plasticizer" available by writing Emery Industries, Inc., Dept. PVP, Carew Tower, Cincinnati 2, Ohio.

AUTOMATIC STAPLER
No Electrical Connections

Model Tap-2 stapler is air operated with fully pneumatic controls. No solenoids, relays, switches, wiring or fuses. Automatic lubrication said to be assured by unique valving arrangement.

Recommended by company for closing overlap cartons, long narrow slotted end closing cartons, and telescope cartons. Can also be used for regular slotted cartons.

Automatic mechanical trip claimed to be important innovation. Container Stapling Corp., Dept. PVP, 308 North Park Ave., Herrin, Ill.



MORSE

DRUM ROTATOR
Variable Speed

A stationary drum rotator for blending, tumbling and mixing is available. The model, 1-5154VS, is designed to handle loads from 500 to 1,000 pounds.

With a pre-lubricated, fully sealed ½ HP motor having a 6:1 variable speed gear reduction, the unit is said to rotate 30 to 55 gallon 24″ diameter drums at any speed from 7 to 40 RPM. Motor connects with 1″ diameter-shaft to operate four 6″ diameter Neoprene drive wheels. Four 6″ diameter roller bearing idler wheels mounted on a ¾″ diameter shaft are said to assure smooth running.

Idler plate and drive and idler wheels adjustable. Morse Manufacturing Co., Inc., Dept. PVP, 727 W. Manlius St., East Syracuse, N. Y.

PIGMENT PASTES
For Latex Emulsion Paints

Water dispersible pigment pastes for latex emulsion paints featuring high solids content, compatibility with all accepted water emulsion vehicles and high tinting strength are available.

Solids contents said to range up to 70 percent in nine colors comprising "Tulip-Tone" line. Reduction in water content claimed to permit better control of paint formulation and easier handling in production.

Company claims storage space reduced by approximately 50 per cent.

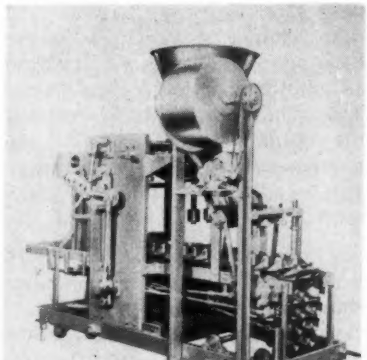
Available in Permanent Yellows, Toluidine Reds, Scarlet Red, Naphthol Red, and Permanent Blues and Greens, pastes are compatible with styrene-butadiene, acrylic, polyvinyl acetate and other water emulsion vehicles.

Holland Color & Chemical Co., Dept. PVP, Holland, Mich.

FILLING MACHINE
For Fiber Cartridges

High-speed, heavy-duty filling machine, claimed to be the first of its kind for packing of fiber cartridges with caulking, roofing cement, buffing compound and similar viscous materials, has been introduced.

The machine, known as Type 27 Cartridge Filler, is said to provide greater filling speed with less labor.



HOPE

Only one operator is required to feed cartridges into the dispensing

stacks at the infeed end. The same operator keeps the unscrambler barrel filled with lids and checks the machine's performance.

Cartridges are automatically removed from the dispensing stack and conveyed to the filling station, where they are filled from the bottom up to insure a uniform fill without air pockets.

An unscrambler barrel is provided to supply lids to feed chutes mounted above each filling line. In the next operation, the press station pushes each lid firmly into the cartridge to the required depth.

Cartridges are automatically ejected from holding pockets at the discharge end of the machine and a conveyor belt carries them to the packing department.

Hope Machine Co., Dept. PVP, 9400 State Road, Philadelphia 14, Pa.

FAST-CURING RESINS
High Impact Resistance

Company announces two fast-curing surface coating resins, said to provide maximum hardness and greater impact and chemical resistance than conventional finishes.

Both Cyzac 1006 and Cyzac 1007 are said to provide flexibility, high initial gloss and gloss retention, good enamel stability and better adhesion than conventional finishes.

Cyzac 1006, without primer, is for use when initial color and color retention are important. Cyzac 1007, with primer, gives baked finishes with unusually good adhesion and impact resistance. Both are compatible with most commonly used pigments dispersed by roller or pebble mill grinding, and are available from American Cyanamid Co., Plastics & Resins Division, Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.

THIXOTROPIC VEHICLES
For Interior Finishes

"Arothix 4000-ML-40" has been announced as the first in a new line of thixotropic vehicles for interior finishes. Company states it was developed for use in "jell" flat wall paints, wall primer sealers and enamel undercoats.

In amounts up to 25 per cent, the new vehicle can also be used to modify other architectural type finishes, manufacturer says. It is claimed that such use promotes ease of application, non-settling and non-sagging.

Properties attributed to "Arothix 4000-ML-40" hold that it is thoroughly compatible with medium oil alkyds, long oil alkyds and "Q" linseed oil, has excellent color retention properties, sets to touch in 20 minutes and dries tack-free in six hours. Archer-Daniels-Midland Co., Dept. PVP, 700 Investors Bldg., Minneapolis 2, Minn.

GRADUATED CYLINDERS
High Accuracy

A line of Shellbach graduated cylinders is now available, featuring Shellbach graduations and lifetime blue and white striping.

High accuracy is claimed for wide blue vertical line bordered by bands of etched glass on the limeglass cylinders. Banding method is said to allow high visibility and accurate lining up of the meniscus against the graduations.

Information and catalog materials available from Kern Laboratory Supply Co., Dept. PVP, 8639 Venice Blvd., Los Angeles 34, Calif.

METHALLYL CHLORIDE
For Organic Synthesis

Methallyl chloride is now commercially available for use in the resin and plastics field and in organic synthesis.

The highly electro-negative character of the carbon-to-carbon double bond in the methallyl structure is said to enable methallyl monomers to show enhanced reactivity as co-monomers in free radical polymerization.

The product can be self-polymerized or copolymerized with a wide variety of reactive monomers, according to company.

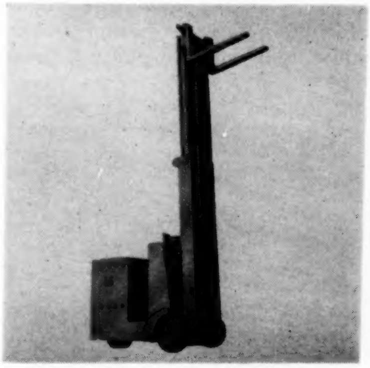
Presence of two highly reactive centers in the methallyl chloride molecule suggests use for the chloride as an intermediate in organic synthesis. FMC Organic Chemicals Division, Food Machinery and Chemical Corp., Dept. PVP, 161 East 42nd St., New York 17, N. Y.

ORGANIC MONOMER
Pilot Plant Quantities

Glycidyl methacrylate for the introduction of epoxide groups into vinyl polymers or vinyl groups into condensation polymers is available in experimental quantities.

Glycidyl methacrylate is a light-colored, almost odorless liquid. The monomer may be polymerized or copolymerized through the double bond and further reacted through the expoxide, or the oxirane ring may be first polymerized so as to leave the vinyl group available for crosslinking.

It will polymerize thermally with ultra-violet light, or with free radical or ionic polymerization catalysts. Technical data and samples available from Room 7021-D, Du Pont Co., Dept. PVP, Wilmington 98, Del.



LEWIS-SHEPARD

DUST-RESISTANT TRUCKS
Complete Protection

Dust-resistant construction is now available on a complete line of electrically powered materials handling trucks, with protection against effects of metal, coal, coke, grain dust and carbon black.

Traction and pump motors totally enclosed and provided with wrap-around brush covers and cork neoprene gaskets to provide tight sealing. Starting and first speed resistors mounted in a tightly gasketed compartment, welded integrally with the main control compartment.

A 16-gauge sheet steel housing with a tight-fitting gasketed flanged cover encloses the main contactors and timing device. Conductors for the main power circuit are neoprene insulated, and provisions are made for protecting the battery compartment and connector.

Dust-resistant features available in riding-type and "walkie" trucks,

both high-lift and low-lift models. Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut St., Watertown 72, Mass.

DRUM WARMERS
Permit Gravity Flow

Extra opening near bottom of Palmer drum warmers permits use of bunghole in lower third of the drum for gravity flow into easily handled containers. New feature optional on 30 and 55 gallon drum warmers at slight additional cost.

Feature said to eliminate possible spillage from pumping through top bunghole and make possible raising of the drum and warmer above floor. Also said to make for faster drawing into large containers than when fluid must be pumped from top.

H. L. PALMER

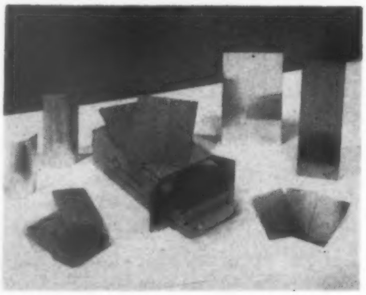
Drum warmers provide thermostatically controlled temperatures in two ranges, 100 to 450 degrees F. and 60 to 250 degrees F. Harold L. Palmer Co., Dept. PVP, 2980 W. Davison Ave., Detroit 38, Mich.

LIQUID DEFOAMER
For Water Based Paints

Liquid defoamer, Surfynol 104A, claimed by manufacturer to have shown excellent results in polyvinyl acetate, butadiene-styrene and acrylic paint formulations.

New material is added to pigments, preventing foaming during grinding. It can also be added during let-down to eliminate pinholing and foaming in brush or roller application.

Product is said to be first of ditertiary acetylenic glycols to be developed specifically for defoaming aqueous systems. Available from Air Reduction Chemical Co., Division of Air Reduction Co., Inc., Dept. PVP, 150 East 42nd Street, New York 17, N. Y.



Q-PANEL

TEST PANELS
In Eight Standard Sizes

Standardized steel and aluminum panels for testing and displaying paints and finishes are said to offer increased accuracy. Particular care taken to assure that the surface finish is uniform and free from flaws which might cause erroneous test results.

Clean and ready to use, panels are wrapped in VPI paper, sealed twenty-five to a polyethylene bag to prevent rust or contamination. Panels come in eight standard sizes, ranging from 3"x6" to 6"x 12", including all common panel sizes.

Panels are made from steel rolled to specifications typical of automotive and appliance grade sheet, and are flattened after fabrication to insure accuracy in testing and display. May be curved for display purposes.

The Q-Panel Co., Dept. PVP 14122 Lorain Ave., Cleveland 11, Ohio.

DRUM HANDLER
Positive Locking Action

CeCOR Model 66 drum handler permits one man to handle drums weighing up to 1,000 pounds safely. Positive locking action claimed, which clamps chimes of all standard 30 and 55 gallon drums with up to 2,500 pounds pressure for accident-free upright transportation.

Operator rolls drum handler to drum, moves clamp handle to rear position and lifts load with hydraulic pump and ram in six seconds without changing position behind the handler. Load said to be always in balance.

Model 66 said to have plant-wide application. Narrow turning radius makes it especially useful in crowded plant aisles, warehouse or loading dock.

Also available with Model 76 drum dispenser is hand-operated, one way 10 gpm pump for dispensing oil, coolants and solvents directly to machine tool.

Coolant Equipment Corp., Dept. PVP, Verona, Wis.

COOLANT

ALKYD COATING RESINS
Thixotropic Features

Two new alkyd resins for use in architectural, marine and maintenance coatings are available commercially.

ZA-600 Anathix resin is characterized by outstanding thixotropic features. Anathix thixotropic resins reportedly can be used alone, or in combination with a long-oil alkyd, to formulate efficient, durable enamels in flat, semi-gloss or gloss classifications.

Product is said to offer easier handling, wider compatibility, greater versatility, better brushability and superior weather-resistance than conventional thixotropic vehicles.

ZA-129 Glyptal alkyd resin solution is described as a premium quality long-oil alkyd. Said to provide excellent weather-durability, rapid air-dry time, low odor and outstanding gloss and gloss retention.

General Electric Co., Chemical Materials Dept., Dept. PVP, 1052 West Sixth St., Los Angeles 17, Calif.

LEVEL CONTROLLER
Explosion-Proof System

Recently developed combination pneumatic-electronic level controller is now available in explosion-proof model, for use in Class 1 Group C and D and Class II Group E, F and G hazardous locations.

Model is capacitance-actuated, and will convert the smallest change in level into proportional air output, according to company. Level controller has been used with granular solids as well as with liquids, with specially designed probes installed.

Called "Pneutronic," level controller systems come in two types of pneumatic action. Model 111 produces an increase in air output with an increase in measured level. Model 112 produces a decrease in air output with an increase in measured level.

Fielden Instrument Division, Robertshaw-Fulton Controls Co., Dept. PVP, 2920 North 4th St., Philadelphia 33, Pa.

MANGANESE-BON PIGMENT
Permanent Dark Red

Roman Red No. 1082 is now being offered as a moderately priced, permanent dark red. Manganese-BON pigment is said to have excellent to good exterior durability depending on color concentration.

Recommended for use in red enamels where it can be economically blended with Ming Oranges to make non-bleeding enamels with durability from one to two years with good odor and gloss.

Makes somewhat buttery inks, but said to be useful for tin printing, poster inks or where lightfast reds are required. Claimed to be excellent for vinyl polyester, polyethylene and some styrene applications.

Kentucky Color and Chemical Co., Inc., Dept. PVP, Louisville, Ky.

PLATFORM LIFT TRUCK
Has Hydraulic Pump and Ram

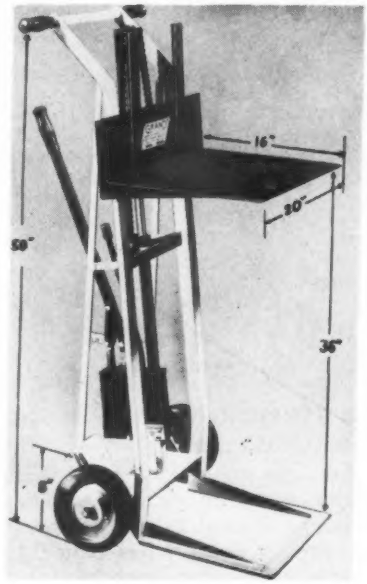
Grand portable platform lift truck now has added manually operated 4-speed hydraulic pump and ram, said to be able to raise 500 pound loads 54 inches from ground in 30 seconds.

Speed adjustment permits lighter loads to rise faster. Long pump handle lifts as much as 4½ inches per stroke with only 40 pounds pressure.

Truck designed to do various lifting, moving and stacking jobs in shops and plants. Moves motors and dies into position, unloads trucks, and stacks heavy boxes and crates.

Safety features include heavy-duty 20″x16″ steel pallet, roller bearing eight-inch texite wheels, large foot rest for balancing loads and balance fork to prevent tipping.

Grand Specialties Co., Dept. PVP, 3101 W. Grand Ave., Chicago 22, Ill.



GRAND

DIISOCYANATE
In Development Quantities

Nacconate 310, dimethyldiphenylmethane diisocyanate, is now available in developmental quantities. Claimed by manufacturer to form relatively stable water emulsions, and to have unusually low reaction rate and low vapor pressure.

National Aniline Division, Allied Chemical & Dye Corp., Dept. PVP, 40 Rector Street, New York 6, N. Y.

MILDEWCIDES
Specifically for Paints

Key mildewcide X-10, an organotin complex, has been developed for the paint industry, designed for use in polyvinyl acetate emulsion paints.

Said to disperse quickly and uniformly in water. May be added to pigment paste formulation just prior to adding the pigment. Not sensitive to ultra-violet light. Soluble in drying oils.

Key mildewcide XY-10 is a bimetallic organic complex containing mercury and tin. Developed specifically for use in polyvinyl acetate emulsion paints. Said to be pound for pound substitute for soluble mercury compounds now commercially available. Soluble in drying oils.

Key Chemicals Corp., Dept. PVP, Box 692, Miami Springs, Fla.

SEQUESTERING AGENTS
For Water Softening

A complete line of sequestering, chelating and complexing agents called Monaquests are now available in commercial quantities. Primarily for water softening, product said to be suitable where it is necessary for alkaline earths and heavy metal ions to be arrested or sequestered.

Product said to be of value in controlling and arresting unwanted traces of calcium, iron, magnesium, aluminum and other metallic ions in solution.

Specifications and samples from Mona Industries, Inc., Dept. PVP, P.O. Box 1786, Paterson 17, N.J.

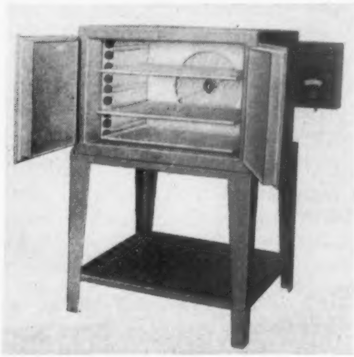
ADDITIVE
Thixotropic Agent

Thixotropic agent said to effectively inhibit crawling, sagging, draining and pigment settling in polyester resins has been announced.

Additive characterized by easy stir-in, with maximum results said to be attained at temperatures between 90 to 110 degrees F. As little as 0.2 percent of product, called THIXCIN® E, is claimed to impart a highly thixotropic body to polyesters, with result that such compositions may be easily applied, yet do not drain or sag after application.

Available from Baker Castor

Oil Co., Dept. PVP, 120 Broadway, New York, 5, N. Y.



L & L

TURBO-CONVECTION OVENS
For Accurate Heating

A unique line of ovens for paint baking and chemical processing has been developed, designed for accurate heating.

Close heating chamber gradients of plus-minus three degrees F. are made possible by a combination of full muffle directed forced convection and recirculation, unique fan construction, powerful fan motor, proper controller selection, adjustable fresh air inlet and exhaust vent and correct insulation.

Six standard models range from 225 to 1,000 degrees F. and from 4.75 to 27 C.F. in chamber heating size. "Turbo-Convection" ovens, L&L Mfg. Co., Dept. PVP, 182 8th St., Upland, Del. Co., Pa.

HOT SPRAY HEATERS
"Dial-a-Matic" Control

Now available are "Viscomatic" Hot Spray heaters with temperature and viscosity control by setting of external dial.

Heaters said to be adjustable to material being used, rather than requiring re-formulation. Temperature control may be accomplished at any level between 90 and 180 degrees F. with finger-tip "Dial-a-Matic" control.

Said to handle all standard paint materials as well as specially formulated hot spray materials with equal ease. Special features are maintenance-free centrifugal pump, "coil-less" heat exchanger and "Dial-a-Matic" controller.

Spee-Flo Co., Dept. PVP, 720 Polk, Houston 2, Tex.

AIR-POWERED RAM
Pump Directly from Drum

Air-powered ram said to force thick, gummy or semi-solid materials from original 55 gallon drums, has been improved to accomodate Bulldog Series Powerflo pumps.

Company says spraying, extruding or transferring of materials now done more easily and economically because ram and pump work simultaneously. Follow plate of the unit is rammed into drum by air pressure, forcing material into pump as it descends with wide, flexible edge following drum irregularities.

Entire unit works on plant air pressure with only three valves for control. Gray Co., Inc., Dept. PVP, 36 Graco Square, Minneapolis 13, Minn.

GRAY

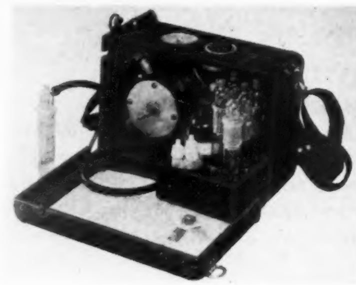
AIR SAMPLING KIT
Detects TDI Vapors

An air sampling kit for use as a health safeguard against toluene di-isocyanate and TDI-urea vapors in concentrations of less than 0.1 ppm has been announced.

The kit consists of a hand-cranked, four-cylinder pump with regulator and timer which permit drawing samples of air at one liter per minute for three minutes through an all-glass impinger tube containing 15 ml of dilute aqueous acid solution.

If the air sample contains TDI or TDI-urea it hydrolyzes to an amine. The amine is converted to a diazo-amine compound and then turned to a rose pink color by addition of three liquid reagents which are provided in a replaceable package with the kit.

Mine Safety Appliances Co., Dept. PVP, Pittsburgh, Pa.



MINE SAFETY

COLOR CHIPS
New Color Control Process

Color chips claimed to be "drift resistant" are now being produced. Manufacturer says they will not change color noticeably as they age.

New color control process combines base that will not yellow and pigments that will not fade. Claims are based on tests for yellowing, light-fastness and stability pigments alone and in combination after being artificially aged. Time comparisons still being made.

New product is said to enable paint manufacturers to lay in larger supplies than was feasible when colors faded or yellowed. Large volume users may now take advantage of long-run economies without risk of color drift.

Colwell Color Card Division, Colwell Press, Inc., Dept. PVP, Minneapolis, Minn.

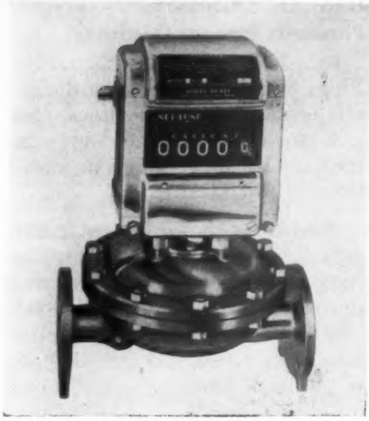
BLUE TONER
Permits Ease of Dispersion

Cyan Blue Toner XR 55-3760, phthalocyanine blue pigment, has been developed primarily for the plastics, rubber and floor covering industries.

Pigment is said to provide ease of dispersion and good strength development even under adverse conditions of milling. Redness of shade, resistance to heat and light and high strength are also claimed.

Bulking properties are: specific gravity-1.50, density (lb./gal.)-12.5, bulking value (gal./lb.)-0.080.

Pigment Division, American Cyanamid Co., Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.



NEPTUNE

LIQUID METER
Resists Chemical Attack

Stainless steel liquid meter available said to make possible close metered control over corrosive solutions and chemicals which must be kept pure. Only one moving element exposed to liquid.

Said to be virtually immune to chemical attack, and to maintain high accuracy over long periods of service in batch mixing and general process work. Measures liquids "inside the pipe" to eliminate many of the hazards of handling corrosive liquids.

Meter casing and measuring chamber are Type 316 stainless steel. Nutating disc achieves nonpulsating action with few working parts. Gear train is mounted outside meter casing and is completely isolated from the liquid.

Capacity of the 1½ inch meter ranges from 20 to 100 gpm. It is available with choice of direct-reading, ticket-printing or autoswitch registers, which can be calibrated for U.S. gallons and pounds, and Imperial gallons, liters and other units.

Neptune Meter Co., Dept. PVP, 19 West 50th St., New York 20, N. Y.

BARREL TRUCK
Loads Automatically

Barrel truck now being offered for easy handling of barrels weighing up to 1,000 pounds.

To load, truck is shoved against barrel or drum. Sliding steel catch is dropped down over barrel or drum rim and truck handles pulled back for automatic loading said to be accomplished without rocking or tugging.

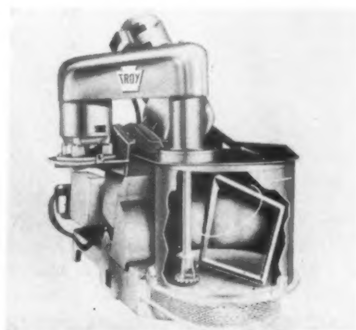
Said to load from row as easily as when barrel stands alone. Constructed of heavy tubing and other steel parts-all welded. Contains two roller bearing wheels. Greatest width at any point is 22 inches, permitting passage through narrow aisles and doors. Weighs 85 pounds

Palmer-Shile Co., Dept. PVP, 12622 Mansfield, Detroit 27, Mich.

MIXER-DISPERSER
Combines Operations

Duplex Disperser combines mixing advantages of a diamond-shaped agitator rotating on angular axis, with mulling, shearing and impinging action of powerful revolving disperser head.

Disperser head turns at 3600 rpm, forcing the material into mulling zone and out toward the sides of the rotating change can, where it is again swept into the agitator blade, repeating the mixing-dispersing cycle.



TROY ENGINE

Process said to insure excellent wetting action, improved color dispersion and uniform blending into a smooth, finished, homogeneous batch requiring no further processing. Duplex Disperser available in 60-gallon units at present.

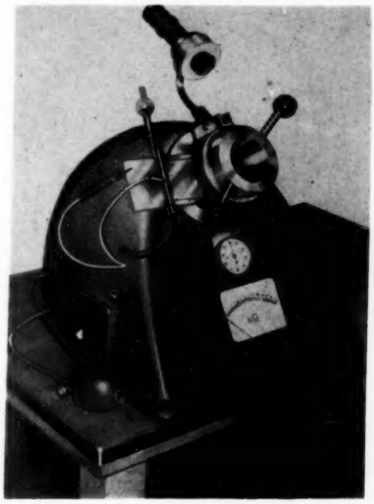
Trow Engine and Machine Co., Dept. PVP, 707 Parsons St., Troy, Pa.

RUST SOLVENT, PENETRANT
In Aerosol Can

A rust solvent and penetrant reported to penetrate rust instantly and loosen rust-frozen parts easily has been introduced in an aerosol can.

The product is said to be fast drying, non-flammable, non-explosive, non-oily and non-conductive. Useful for removal of deposits from electric motors and machinery.

Called Plasti-Kote Rust Solvent, product is available from Plasti-Kote, Inc., Dept. PVP, 9801 Harvard Ave., Cleveland 5, Ohio.



ERICHSEN

TESTING MACHINES
Push-Button Control

Model 225 testing machine is available with electro-hydraulic drive and push-button control.

Designed for the rapid and accurate determination of elasticity, adhesion, porosity and aging. Said to be useful for Erichsen cupping test, din standard 50101, to determine and follow up crack formation in coating material during deformation by microscopic or macroscopic means.

Also said to be useful for Erichsen stamping lacquer test to determine technological properties of stamping and deep drawing lacquer. May be operated by untrained personnel.

Information from Richard Schachne, Dept. PVP, 545 Fifth Ave., New York 17, N.Y.

FLUORESCENT COLORS
Add Life to Signs

A line of fluorescent screen process sign and display colors has been introduced nationally, designed to speed printing and add life for both interior and exterior signs, posters and displays.

Colors said to air-dry in 10 to 15 minutes, force dry in 30 seconds or less. Company says colors do not skin over in the pack-

age and remain open in the screen, despite fast drying rate.

Eight colors available under trade name "Sher-Will-Glo." The Sherwin-Williams Co., Dept. PVP, Cleveland 1, Ohio.

WITT

DRUM DOLLY
Facilitates Drum Handling

Drum dolly, hot-dip galvanized for rust resistance, converts 55 gallon drums to mobile containers able to be used indoors and outdoors.

Product accomodates drums having O.D.s up to 25", and has capacity of 600 pounds. Fabricated of 1/8" x2¼" strip steel, dolly has four stem-type ball bearing casters available with three-inch iron or rubber wheels. Off-the-floor support reduces corrosion and wear on drum bottoms.

The Witt Cornice Co., Dept. PVP, 2121 Winchell Ave., Cincinnati 14, Ohio.

PLASTIC SKIN COATING
Prevents Dermatitis

Now available is a skin protective coating consisting of plastic dispersed in gel form in a water base. Said to be useful to workers in paint compounding and manufacture where dermatitis is a hazard.

Plastic film barrier formed by evaporation of "Ply no. 9 Gel" is claimed to be impervious to epoxies, amines, styrenes, lacquers, thinners, paint removers, vegetable oils, petroleum derivatives and most organic solvents. Said to be attacked only by acetone and methyl and ethyl alcohols.

Skin coating is not penetrated by abrasive dust, glass fibers or fine powders. Product is said to be non-irritating, non-toxic, non-absorbing and non-drying to the skin, and may be freely applied to arm, neck and face as well as to hands. It is water soluble and not recommended against water-based irritants.

Milburn Co., Dept. PVP, 3246 E. Woodbridge, Detroit 7, Mich.

SUCTION FILTER ASSEMBLY
All Plastic for Long Life

A suction filter assembly made entirely of plastic has been developed, said to provide superior service life and reduced cost for operation under many corrosive conditions.

HAVEG

Glass or synthetic filter cloth operating over filter grid plates claimed to provide longer life than is possible with stainless steel, monel or other corrosion resistant materials. Prices also said to be competitive with stoneware and rubber lining.

Equipment may be used in services involving temperatures as high as 350°F., according to manufacturer. Available in wide range of designs and in different plastics for different corrosion resistant requirements.

Haveg Industries, Inc., Dept. PVP, 900 Greenbank Rd., Wilmington 8, Del.

EPOXY PLASTICIZERS
Provide Low Viscosity

Two epoxy plasticizers have been introduced, reported to impart outstanding low-temperature performance and color stability to polyvinyl chlorides and other polymers with reduced plasticizer loss due to volatility.

Plasticizers said to provide low viscosity and good viscosity stability for plastisols.

Products, named Celluflex 21 and Celluflex 23, are available from Celanese Corp. of America, Dept. PVP, 180 Madison Ave., New York 16, N. Y.

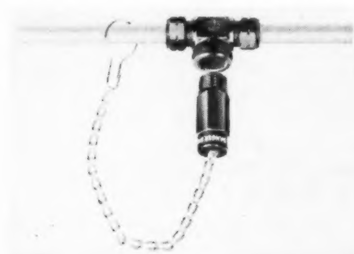
DANGER SIGNAL
Pinpoints Pipeline Openings

Free-hanging Danger Signal Bull Plugs pinpoint locations of dangerous openings in piping lines. Signals are easily seen and give immediate warning of unsafe conditions or fire hazards.

Painted with bright red bands, signals are attached to piping, and hang near openings to warn of danger. Also said to provide safe, positive and convenient method of gaining access to a threaded port of piping or valve.

Signals are easy to remove and replace because long shank provides a good grip. A long thread is provided to meet installation conditions normally encountered.

Available in steel and stainless steel in size range from ¼" pipe to 2" pipe from Crawford Fitting Co., Dept. PVP, 884 E. 140th St., Cleveland 10, Ohio.



CRAWFORD

BLUE AND RED PIGMENTS
New Shades Announced

Softex Blue No. 4200 and Roman Red No. 1082 have been developed.

Blue has been designed to provide soft textured pigment which retains greenish-clean tint normally associated with harder textured blues. Pigment is coarsely ground because of inate softness, minimizing sintering of particles and preventing dusting during mixing operations.

Red is manganese-BON pigment offered as moderately priced, permanent dark red with excellent to good exterior durability, depending upon color concentration. Recommended for use in red enamels where it can be blended to make non-bleeding enamels with durability from one to two years with good color and gloss.

Kentucky Color and Chemical Co., Dept. PVP, Louisville 12, Ky.

U-F RESIN
Accelerates Baking Speed

Urea formaldehyde resin for white baking enamel formulations, called Uformite F-222, has been announced.

Said to offer combination of improved gloss with accelerated baking speed, as well as improved hardness, adhesion to non-drying alkyds and resistance to food stains and water.

According to technical notes available from company, physical constants are: solids-50 per cent, butanol-30 per cent, xylol-20 per cent, viscosity (as supplied)-T-W, acid number-14 to 18, color-colorless and clear, mineral thinner tolerance-20 c.c. minimum per 10 grams of solution, isooctane tolerance-15 c.c. minimum per 10 grams of solution, weight per gallon-8.4 pounds.

Rohm & Haas Co., Resinous Products Division, Dept. PVP, Washington Square, Philadelphia 5, Pa.

HANDLING DEVICE
Fork Truck Attachment

Handling of normally palletized goods without pallets is now said to be possible through use of multiple attachment for fork trucks.

Attachment consists of multiple forks, side-shifter and push-off device. Six forks remove goods from multiple-prong device at end of production line. Load is deposited in carrier by being pushed off prongs with push-off device, and may either be placed on floor or stacked upon other goods. Side shifter makes horizontal movement of forks possible for placement of goods on special storage racks.

Adaptable to Lewis-Shepard Model E trucks. Lewis-Shepard, Dept. PVP, Watertown, Mass.

DICYCLOPENTADIENE
For Resins and Drying Oils

A high-purity dicyclopentadiene is now being marketed for use in the manufacture of organic chemicals, including resins and drying oils.

Product, said to have a purity of at least 95 percent, is available either in drums or tank-car lots.

Product said to combine easily with large variety of unsaturated acids and aldehydes to form cyclic and bicyclic compounds. Also said to lend itself to production of ketones, fulvenes and oximes.

Enjay Co., Inc., Dept. PVP, 15 West 51st St., New York 19, N.Y.

DRUM HEAD CUTTER
No Saw Tooth Edges

Hand operated head cutter needing no electrical outlets or air connections has been developed.

Product promotes safety by eliminating damage to hands from rough edges, agitation of poisonous dust or fumes which occur with pounding, and danger from sparks or flames when cutting torch is used.

Sealed gear case and worm gear assembly, adjusting track cast in hard, sparkproof bronze, and ample bearing capacity for hard service are all features. Michael A. Schinker Mfg. Co., Dept. PVP, 6514 S. Western Ave., Chicago 36, Ill.

SCHINKER

STAPLING MACHINE
Air Operated

Model BSA-Triplex air operated bottom stapler sets up carton bottoms using industrial size staples.

Machine drives three staples simultaneously on initial stroke, sealing end of carton. On the next stroke the two outer heads are inactivated by means of a mechanical trip. Center head then drives staple across center seam. Box is turned around and process repeated for other end.

Manufacturer says machine drives 600 staples per minute or more, depending upon experience of operator. Frame manufactured of hollow steel tubing for sturdy, light weight construction. Nonmovable anvils are of wear-resistant steel. Wearing surfaces are hard chrome plated.

Container Stapling Corp., Dept. PVP, 308 N. Park Ave., P.O. Box 247, Herrin, Ill.

BRIGHTNESS METER
High-Sensitivity

Automatic, high-sensitivity brightness and reflectance meter is now available.

Instrument is composed of high-sensitivity exposure head and a measurement unit. Exposure head is designed so that samples may be measured in either horizontal or vertical position. Rubber feet installed on two sides of the instrument facilitate placement in desired position.

Dimensions of exposure head are 13″ x 13″ x 12″. Source of illumination is provided by G. E. 1209 lamp. Light beams are directed to sample in four directions by plurality of four lenses and four mirrors. Only one lamp required for four light beams.

Gardner Laboratory Inc., Dept. PVP, P.O. Box 5728, Bethesda, Md.

DEFOAMING AGENT
For Latex Paints

An auxiliary product called "Glycosperse" has been developed to overcome excessive foaming which occurs in coatings based on styrene-butadiene copolymers, PVAc and acrylic latices when the pigment paste is added to the latex.

The product is a special surfactant that acts as a pigment grinding aid and foam minimizer. It is said to be compatible with most additives, and aid in their solution and stability.

"Glycosperse" is a straw-colored, oily, non-viscous liquid said to be 100 per cent active and to contain no diluents. Economical because of small quantities required for effective results.

Glyco Products Co., Inc., Dept. PVP, Empire State Building, New York 1, N. Y.

CMR INSTRUMENT
For Opaque Material Study

A low-cost contact micro-radiography (CMR) instrument is available for industrial research, enabling researchers to study opaque materials which are difficult to handle with visible light methods.

X-ray technique also provides additional information in most types of examinations because X-rays are absorbed differently from light rays by various materials. CMR said to be valuable complimentary tool for use with light-optical and phase-contrast microscopes.

Techniques have been developed for handling wet and dry specimens. Instrument is contained in a portable cabinet approximately 14" x 11" x 8", and fits on average darkroom tables.

Instruments Division, Philips Electronics, Inc., Dept. PVP, 750 S. Fulton Ave., Mount Vernon, N. Y.

PHILIPS

LABEL PASTERS
For Ungummed Labels

Counterboy Label Pasters, manual, motor driven and automatic feed, handle ungummed labels from ½" to 18" wide.

Glue is applied as full coverage with adjustable controlled supply, or along edge of surface. Where tight adhesion is a problem, electric heaters are available to keep flexible animal glue at proper working temperature.

Pasters are available in 14 models from Better Packages, Inc., Dept. PVP, Shelton, Conn.

SUSPENDING AGENT
Imparts Thixotropic Body

A heat stable thickening agent called "Thick Aid" is now being offered.

Product said to form a gel structure of strong suspending power, imparting viscosity which eliminates sagging, prevents settling and penetration and improves brushability, color and sheen uniformity.

Manufacturer says pigment flooding is inhibited when product is added in small amounts to paints. Product is composed of processed clay which imparts thixotropic body.

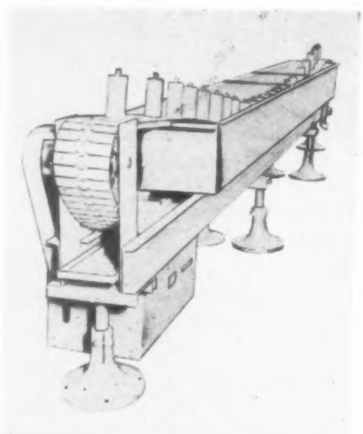
Abco Chemical Co., Dept. PVP, 2316 Atlantic Ave., Brooklyn 33, N. Y.

SURFACE-ACTIVE AGENT
Speeds Emulsification

Kelecin 1081 is the trade name of a licithin surface-active agent whose function is to increase speed of emulsification and aid in pigment grinding and dispersion for all types of water base paints.

Product is described as being especially low in viscosity and light in color compared to other materials used for similar purposes. Said to be effective in promoting emulsion stability.

Samples available from Technical Service Dept., Dept. PVP, Spencer Kellogg and Sons, Inc., Buffalo 5, N. Y.



ISLAND

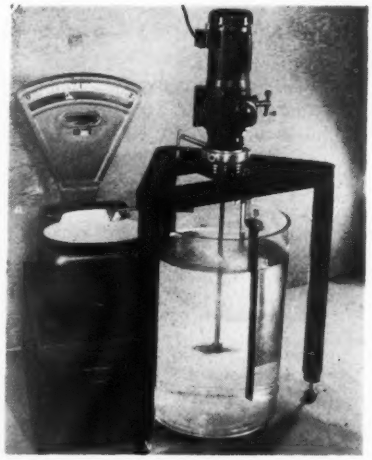
TEST TANK
Automatic Test for Aerosols

Heat and leak test tank is available for testing aerosols automatically. Unit consists of a tank and movable chain belt that carries the aerosol down into the tank and up out of it.

Stainless steel Rex Table-Top chain comes in widths for single or double rows of aerosols. Cans prevented from floating or slipping on incline and decline by magnets attached to chain track.

Tank may be constructed of hot-dip galvanized or stainless steel, and unit serves as both heat and leak test tank.

Island Equipment Corp., Dept. PVP, 27-01 Bridge Plaza North, Long Island City, N. Y.



CHEMINEER

AGITATOR ACCESSORY
For Horsepower Determination

A dynamometer accessory for the ELB Experimental Agitator permits direct determination of required horsepower for mixing non-Newtonian fluids and gas-liquids. Company says accessory eliminates estimation.

Accessory consists of three-leg stand with adjustable leveling feet, ball thrust bearing mounting for ELB mixer and a moment arm assembly which pivots from a bracket fastened to one leg of the stand. Motor torque is transmitted through the arm to the pan of a laboratory scale, where the amount of the force is displayed in pounds.

Horsepower is determined by substituting derived values in the standard horsepower formula. Chemineer, Inc., Dept. PVP, 1044 E. First St., Dayton 2, Ohio.

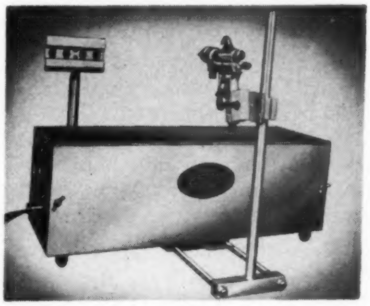
VAT COLOR PIGMENTS
From Yellow to Deep Red

Now in production are light-fast vat color pigments called "Century Colors," available in eight colors ranging from yellow to deep red.

Said to be for permanent and bright tints in pastel enamels,

polychromatics, transparent or flamboyant enamels for lacquers, and many vinyl lacquers, pigments provide brightness and ease of dispersion.

Bulletin containing color chips, physical properties, physical tests and test results available from Kentucky Color and Chemical Co., Dept. PVP, 600 N. 34th St., Louisville 12, Ky.



ECLIPSE

ELECTRIC SPRAYING UNIT
For Accurate Color Matching

Electric test panel spraying unit has been announced, said to allow standardization of paint application on test panels. Company claims sprayer will precisely color match one paint batch with another.

Light weight portable electric model contains 1/6 horsepower explosion-proof motor. Fine control of panel speed, gun distance, angle and height are claimed. Sprayer is designed to hold any standard make spray gun, and can also be modified to allow greater variation of speed and gun adjustment to suit special requirements.

Available in both electric and air-motored models from Eclipse Air Brush Co., Dept. PVP, 390 Park Ave., Newark 7, N. J.

STEARIC ACID
Color Stable

Double pressed stearic acid that is guaranteed for color stability is being offered.

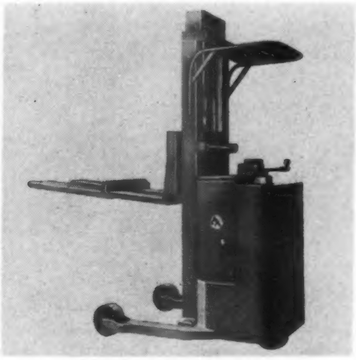
The product, called Neo-Fat 18-54, has a guaranteed color stability of 4.0 Red and 30 Yellow on a 5¼" Lovibond scale, after being subjected to 200 degrees C. for two hours. Said to be able to withstand high temperatures with minimum color degradation.

Armour Chemical Division, Dept. PVP, 1355 W. 31st St., Chicago 9, Ill.

ELECTRIC TIERING TRUCKS
Operate in Narrow Aisles

Riding-type electric tiering trucks are being offered with HydraFork attachments to facilitate their use in extremely narrow aisles.

Trucks have ten-inch diameter rubber-tired wheels for added floor protection. Can handle pallets of all widths.



LEWIS-SHEPARD

HydraFork is available on all Lewis-Shepard Model "M" and "MN" electric tiering trucks in capacities to 3000 pounds. Trucks are operated from a stand-rest driving position, and are produced with a wide range of fork elevations.

Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut St., Watertown 72, Mass.

ABRASION TESTER
For Wet and Dry Tests

Production as been announced on a Multi-Directional Abrasion Tester for durability studies of materials such as floor finishes.

A complex rubbing and twisting action is achieved by contact of a reciprocating table, which holds the abrasive, and a rotary head to which the sample is attached. Instrument is equipped with a grit surface table and a rubber sheet table. Variety of additional abrasive surfaces may be substituted.

Stroke counter, clearer brush and an attachment for varying pressure on the sample insure standardized conditions for tests on both wet and dry surfaces.

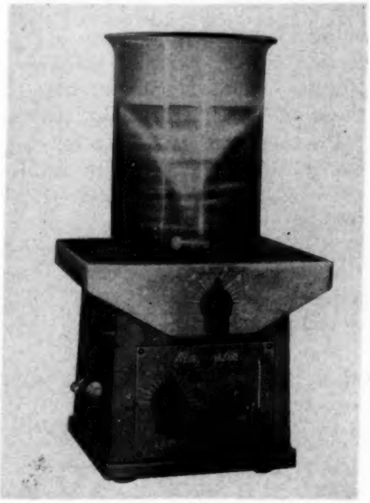
United States Testing Co., Inc., Dept. PVP, 1415 Park Ave., Hoboken, N.. J.

MAGNETIC STIRRER
Can Also Be Heater

Triple duty six-inch magnetic stirrer, which serves as hot plate, stirrer, or both is now available. Said to be suitable for all types of laboratory stirring and heating.

Called Pyro-MagneStir, product contains die cast base enclosing built-in motor, rheostat speed control for motor, motor switch, six-inch square aluminum hot plate with built-in thermostat, hot plate switch and two seamless Teflon-covered stirring bars.

Special baffles and air circulating system said to prevent overheating of motor. Labline, Inc., Dept. PVP, 3070-82 W. Grand Ave., Chicago 22, Ill.



LABLINE

TRIMETHYLOLPHENOL
For Resin Development

Trimethylolphenol in sample quantities is available for research testing and field evaluation. Said to have a broad potential use in industrial coatings and other chemical compositions where its structure and high reactivity could be of advantage.

New material is claimed to represent a significant advance over previous water-soluble phenolic resins in that it is a single chemical species. May be used as a building block to form new chemical compounds. Can also be used to form resins.

Chemical reactivity makes new product attractive as cross-linking agent for compounds or polymers

containing active hydrogens. BR-LA1030, 70 percent aqueous solution, is said to have viscosity of 50 to 70 centistokes at 25 degrees C.

Solution said to be miscible with methyl alcohol, eithyl alcohol and acetone. Will react as a one-step phenolic resin, slowly converting to a resin at room temperature. But in range of 150 to 160 degrees C., it will harden in 80 to 100 seconds. The reaction may be catalyzed by acids such as oxalic, phosphoric, or any water-soluble acid.

Bakelite Co., Division of Union Carbide Corp., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

VINYLTOLUENE COPOLYMER
Offers Controlled Thixotropy

Keltrol 1059 is the trade name of a thixotropic vinyltoluene copolymer recently developed. It is recommended by manufacturer as material for flat interior wall paints. Results claimed comparable to those of finest alkyd flat paints.

Product is described as offering controlled thixotropy with resultant easy workability and freedom from separation and hard settling. Said to give excellent non-penetration and color uniformity. No unpleasant after-odor, according to company.

Samples available from Technical Service Dept., Spencer Kellogg and Sons, Inc., Dept. PVP, Buffalo 5, N. Y.

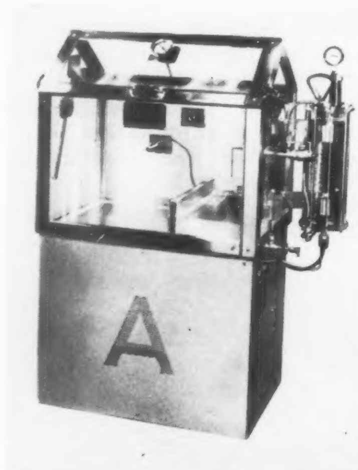
COATING RESIN
For Quick Drying Paints

A coating resin soluble in mineral spirits has been developed specifically as a solution binder. Called Pliolite VT, resin is supplied in form of friable granules and can be solvated by using conventional equipment.

Complete solution is possible with aliphatic solvents having a Kauri Butanol value as low as 36. Films formed by evaporation of solvent rather than oxidation are said to show excellent clarity. Also said to be resistant to acids, alkalis and greases.

Solutions of the new product provide rapid wetting of color pigments, accordingtocompany. Color dispersions may be prepared in ball or roller mills. Color selection said to be limited only by pigment availability. Suggested for use in traffic paint.

Chemical Division, Goodyear Tire and Rubber Co., Dept. PVP, Akron 16, Ohio.



ASSOCIATED

SALT SPRAY TEST CHAMBER
All-Lucite for Visibility

All-Lucite salt spray test chamber for determining salt fog corrosion resistance has been introduced. Said to have wide application for environmental salt spray tests.

Chamber produces fine mist and reaches test conditions within 15 minutes when connected to low pressure air supply. Specimens are suspended from Lucite hanger rods or placed on bottom of chamber supported by Lucite rods. All-Lucite construction said to assure complete visibility from all angles.

Chamber is equipped with temperature controllers and indicators. Dimensions are 20″ x 20″ x 20″. Larger sizes to special order. Contains steel base.

Associated Testing Laboratories, Dept. PVP, 412 Clinton Rd., Caldwell, N. J.

UNIVERSAL TINTING COLOR
Blends With All Base Whites

A universal tinting color is available said to blend with equal success with semi-gloss and flat alkyd vehicles, oleoresinous bases and latex systems.

Colorants are available either as one-shot tube system or standard shelf package form. System employs 12 basic colors capable of producing through cross-mixing a minimum of 288 tints for use with both interior and exterior paints. Standard shelf line offers 24 colors to accommodate every decorating requirement.

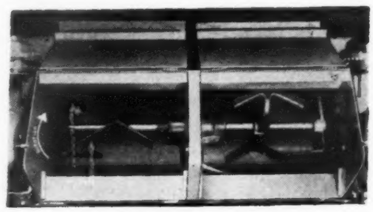
Test samples available from The Craftint Mfg. Co., Dept. PVP, 1615 Collamer Ave., Cleveland 10, Ohio.

HEAVY-DUTY MIXERS
Explosion-Proof Motors

NRM paint mixers are available in single and twin-tank units, with capacities from 80 to 150 gallons. Motors are fully enclosed and explosion-proof, states manufactures.

Single tank mixers have either side or overhead drive. Mixing blades said to combine compressive and shearing action for mixing material thoroughly in less time.

National Rubber Machinery Co., Dept. PVP, 384 Getty Ave., Clifton, N. J.



NATIONAL

CHEMICAL INTERMEDIATE
For Alkyd Manufacture

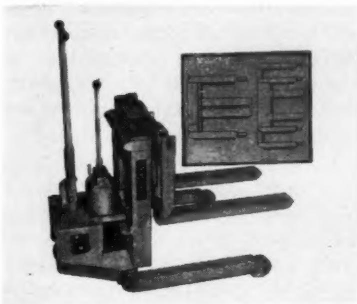
A plasticizer and chemical intermediate, a new form of hydroxypropylglycerine, has been developed by the reaction of glycerine and propylene oxide through a unique process.

A viscous, yellowish-amber liquid, product has an average addition of 2.5 moles of propylene oxide to each mole of glycerine. Said to be less volatile than glycerine, and to have greater permanence on aging, according to tests. Also said to be less hygroscopic than glycerine, affording better dimensional stability.

Called Hyprin GP25, product offers interesting possibilities in the manufacture of alkyd resins and polyesters because of similarity to glycerine. Can be esterified with dibasic acids and anhydrides such as phthalic anhydride to produce products of increased flexibility. May be used to obtain a product with high molecular weight and increased fluidity where a non-

drying alkyd, such as a plasticizer, is required.

Samples available from Technical Service and Development, The Dow Chemical Co., Dept. PVP, Midland, Mich.



LANGLEY

STRADDLE LIFT TRUCK
Handles Skids, Pallets, Rolls

Langley Multi-Purpose hand operated transporter accommodates various size skids, pallets and rolls, as well as machines and reels. Forks slide easily on polished shaft and are said to handle up to 48-inch board width pallets or skids.

Company manufactures two models, Model 30, which handles stringer lengths up to 36 inches, and Model 42, which takes up to 48 inches. Forks are high lifting, allowing load to be raised up to 14 inches. Double lifting chains on equalizing cross head provide maximum safety.

Product has one-ton capacity. Pull-push handle pivots 360 degrees for top maneuverability, and oversize wheels overcome floor irregularities. Adjustable throttle valve permits variable lowering speeds from 0 to 20 feet per minute.

Langley Mfg. Co., Inc., Dept. PVP, 923 Cambridge St., Cambridge, Mass.

MOTOR BASE
Belts Easily Adjusted

Adjusto-Slide Motor Base said to eliminate most of lost time due to stretched and sagging belts is now available. Belt take-up is accomplished by adjusting only one screw without stopping motor.

Replacement of belts is said to be simple operation. Adjusting screw on most models may be loosened and swung aside, freeing the top plate and the motor to move far enough to permit removing the old belt and installing new one.

Other features include accurately die-formed top and bottom members which slide freely, yet always maintain perfect belt alignment, and motor base size and mounting hole spacing which accommodate NEMA frame sizes from 182 through 326V in both old and new designations, from one to 30 horsepower.

The American Pulley Co., Dept. PVP, 4200 Wissahickon Ave., Philadelphia 29, Pa.

AMERICAN PULLEY

AUTOMATIC CARTON MAKER
One Man Operation

New combination one-man automatic carton maker glues and/or tapes bottom flaps before filling as may be specified. Machine may also be used for sealing top-flaps after filling.

"Closed-System" of gluing said to save the usual half-hour make-ready and clean-up time common to exposed glue roll systems. Simple hose clamp allows easy trnsfer to next gallon of glue. For long shutdowns, easy transfer to a bottle of water cleans out glue, with the water remaining in the system for a trouble-free fresh start by transfer back to bottle container of proper glue.

General Corrugated Machinery Co., Dept. PVP, Palisades Park, N. J.

GENERAL CORRUGATED

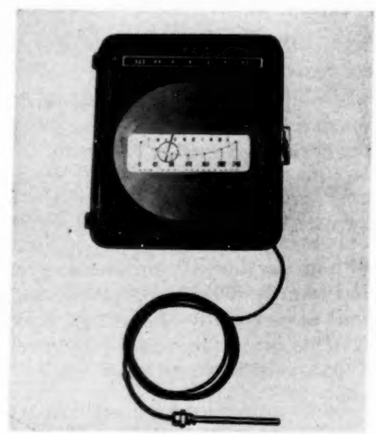
THERMOMETER SERIES
For Uniform Accuracy

Recorders, recorder-controllers, indicators and indicator-controllers are included in the Wheelco 4000 series.

Recorders and recorder-controllers use large, easy-to-read charts. Uniform accuracy said to be assured by use of mercury-actuated sensing elements which offer maximum stability over wide ranges of temperatures. Instruments also feature Bourdon coils, friction-free pen arms and Invar metallic compensation for the instrument cases.

Thermotrol temperature indicators and indicator-controllers use plug-in type chassis. Instruments incorporate same construction features as rest of 4000 series.

All instuments are available either as surface or flush mounted units. Wheelco Instruments Division, Barber Colman Co., Dept. PVP, Rockford, Ill.



WHEELCO

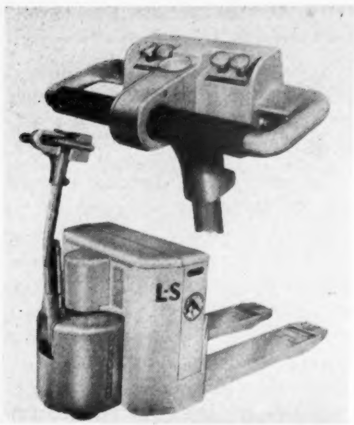
LIFT TRUCK CONTROL SYSTEM
For "Walkie" Electric Trucks

Control system for "walkie" electric trucks offers "dynamic braking" and "controlled plugging."

Designated L-S Roto-Cam Control, the system is offered as standard equipment on all Lewis-Shepard high-lift and low-lift "walkies."

"Controlled plugging" enables truck to come to smooth stop and pick up speed in opposite direction when operator reverses control grip. Wear-and-tear on motor is said to be reduced.

"Dynamic braking" allows truck



LEWIS-SHEPARD

to come to a slow stop when control handle is released or allowed to return to vertical position. Emergency solenoid brake also included, which prevents operator from being struck by truck.

Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut St., Watertown 72, Mass.

ANTI-FOAMER
For Synthetic Paint Latices

Liquid anti-foamer for use with all major synthetic paint latices has been developed.

Product, called Nopco NDW, said to effectively eliminate foam and insure production of paints with proper density, uniform weight and improved brushing properties. Said to be equally efficient in latex systems of acrylic resin, polyvinyl acetate and styrene-butadiene.

Lasting anti-foaming action permits use of paint shakers for blending colors. Protective Coatings Division, Nopco Chemical Co., Dept. PVP, Harrison, N. J.

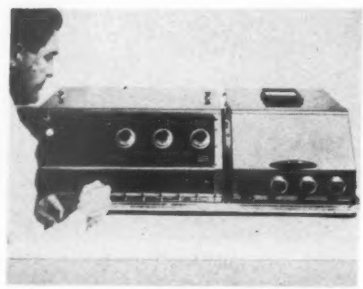
SILICONE RESIN
For High Temperature Coatings

Silicone resin said to provide greater gloss retention after long exposure to high temperatures than previously possible has been developed.

A typical formulation with product, called 808 Resin, pigmented with titanium dioxide (P/B60/100) and thinned with xylene, is claimed to retain original 84 per cent gloss rating after 100 hours at 482 degrees F. When subjected to 572 degrees F. for 400 hours, or to 482 degrees F, for more than 2500 hours, gloss rating said to drop only to 70 percent.

Cured films based on product said to be non-yellowing and to exhibit excellent adhesion, flexibility and resistance to moisture and many common chemicals. Pigment wetting characteristics said to be superior to those of comparable silicone resins.

Developed primarily for use in formulating white and light-colored space-heater and appliance finishes, product is currently available in commercial quantities. Dow Corning Corp., Dept. PVP, Midland, Mich.



GARDNER

COLOR-DIFFERENCE METER
Automatic Standardization

Model AC-2 Gardner Automatic Color-Difference Meter contains high-sensitivity head and automatic built-in standardization features.

Equipment intended to fulfill laboratory and production requirements where speed, accuracy, dependability and ease of operation are criteria of instrument performance.

Basic exposure head houses a lamp with four lenses and mirrors which divide the beam four ways, directing each section upon the sample at a 45 degree angle of incidence. Said to illuminate the sample from four directions to give average readings over entire exposed specimen area.

Claimed to afford precision color measurements of wrinkle finishes and other non-uniform surfaces. Gardner Laboratory, Inc., Dept. PVP, P.O. Box 5728, Bethesda 14, Md.

CORROSION INHIBITOR
For Use in Metal Treating

Corrosion inhibitor for use in sulfuric, sulfamic and phosphoric acids has been developed for metal treating operations such as descaling and pickling baths.

Called Inhibitor 2508, product is an aliphatic derivative which can be used where acids are employed to chemically remove undesirable coatings from metal surfaces. Product is in liquid form, readily dispersible in water and said to be highly effective in low concentrations. May be used at rates as low as 100 to 500 ppm.

Laboratory tests said to indicate that mild steel in 15 per cent sulfuric acid at 200 degrees F. has corrosion rate of more than 2.5 pounds per square foot per day, compared to less than 0.03 pounds per square foot per day in inhibited acid.

Armour and Co., Chemical Division, Dept. PVP, 1355 W. 31st St., Chicago 9, Ill.

GRAY

FLUID TRANSFER PUMP
Starts and Stops Automatically

Lightweight (13½ pounds) fluid transfer pump automatically starts and stops as operator squeezes or releases trigger on high volume, gasoline-type valve.

"Direct-From-Drum" pump said to be spark-free. Fluid remains "sealed-in" from original 55 gallon drum to point of use, eliminating contamination and extra handling. Firm says pump cannot burn out.

Pump operates either in open head or two-inch bung opening of original drum, and is aid to empty a full-size drum faster than the liquid can be poured from the bung. May be used for transferring fluids from drums to smaller containers or for mixing or measuring operation.

Gray Co., Inc., Dept. PVP, 1099 Sibley St. N. E., Minneapolis 13, Minn.

SYNTHETIC PEARL ESSENCE
In Concentrated Form

Nacromer YNC, A synthetic said to produce a lustre equal to or greater than natural pearl essence has been introduced.

Product comes in concentrated paste form, and is said to mix easily with most coating materials. Can be applied by spray, brush or dip to wood, metal, plastic, glass, leather, paper and other materials. May also be incorporated into plastics before molding.

Addition of transparent pigments or dyes permits wide range of lustrous effects. Product now being used to obtain gunmetal, gold and silver finishes. The Mearl Corp., Dept. PVP, 124 E. 40th St., New York 16, N. Y.

PLASTISOL FORMULATIONS
Contain Vinyl Resins

Two plastisol formulations have been developed containing Pliovic AO, a vinyl dispersion resin, and Pliovic S70, a medium visosity resin.

Formulations are expected to find extensive use in rotational molding, following a current trend to replace slush molding. Use of a relatively small amount of plasticizer in formulations said to furnish excellent hardness in finished products.

Wide range of color, gloss and hardness properties said to be obtained by varying formulations slightly. Superior flow characteristics claimed for initial stages of the molding cycle, with exceptional fluidity maintained up to 120 degrees F.

Chemical Division, Goodyear Tire and Rubber Co., Dept. PVP, Akron 16, Ohio.

FLAME TEST UNIT
Measures Flame Spread

Apparatus for measurement of rapidity and severity of flame propagation permits thorough investigation of burning characteristics of all types of materials.

Test assesses quantitatively variables which contribute to the spreading of fire along the surface of building materials. Test is especially useful because of its speed. Can be run with relatively small samples.

Method employs a radiant heat source in front of which a six by 18-inch sample of test material is mounted. Ignition is forced near the top and flame progresses downward. Flame Spread Index is calculated from rate of progress of flame front, together with a factor involving the rate of heat generation.

United States Testing Co., Dept. PVP, 1415 Park Ave., Hoboken, N.J.

LABORATORY RELAY
Transistorized

Laboratory relay claimed to be the first transistorized equipment of its kind is now on the market. Guaranteed for one million contacts with any non-inductive load of four amperes or less.

May be used to control bath or oven temperatures, maintain liquid levels, with a monitoring photocell, to trip an electric counter. Advantages include sensitivity to 12 microamperes input, no warm-up, can't overheat, versatility, compactness, ruggedness, safety and convenience.

Fisher Scientific Co., Dept. PVP, 384 Fisher Building, Pittsburgh 19, Pa.

BATTERY-POWERED TRACTOR
For Pushing and Pulling

A compact, battery-powered tractor for use in both pulling and pushing operations in confined areas is now on the market.

The machine has a normal draw bar pull of 200 pounds, and a breakaway rating of 700 pounds. Tractor has two speeds in both forward and reverse, and travels at two mph fully loaded and 3.2 mph empty.

A 12-volt system powers high torque series wound motor. Available in two models, 39¼ inches long and 44-5/8 inches long, less coupler. Overall width of both models is 32 inches. Weight, without battery, is 1150 pounds.

Powerworker Division, Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

PLATFORM TRUCK
Transports up to 4000 Pounds

"Freighter" platform truck is designed to transport loads of up to 4000 pounds safely through confined aisles and crowded terminal and warehouse areas.

Truck powered by Wisconsin's air-cooled Model AEN engine with fully automatic drive. Engine provides 8.1 horsepower at 3000 r.p.m. for ample power to negotiate ramps up to 10 per cent with full load.

Truck operates at 10 m.p.h. Steering ratios of 1:1 or 3:1 are offered. Electric starting system, engine hour meter and padded operator support included as standard equipment.

"Tugster" industrial tractor with drawbar pull of 750 pounds and same specifications as "Freighter" platform truck also available from Hyster Co., Dept. PVP, 2902 N.E. Clackamas St., Portland 8, Ore.

HYDRAULIC DRUM LIFT
Can Be Used for Pouring

Model BM 3 "High Boy" hydraulic drum lift has been developed to lift loads more than 72 inches for greater ease in pouring. Release of drum lock permits rotating of drums 360 degrees for mixing contents before pouring.

Constructed of heavy-duty steel tube. Hydraulic jack is actuated by food-operated pedal. Lifting weight capacity is 750 pounds. Mounted on four-inch oil, gas and spark proof ball-bearing casters. Floor-lock holds unit in place, and drum lock holds drum in pouring position.

Can be equipped to handle 55 or 30-gallon drums. Special girdles for handling cylinders, carboys and other steel barrels. Dept. PVP, Sterling, Fleischman Co., Box 94, Broomall, 3, Pa.

VINYL EMULSION
For Paper and Textile Coatings

Flexbond 100, a copolymer of vinyl acetate and vinyl stearate, is now available for textile and paper coatings, adhesives, saturants and binders.

Film properties said to include unusually high water resistance, fine particle size, clear and transparent film, permanent flexibility, excellent adhesion, non-toxicity and grease-proofness.

Paint finishes and protective coatings formulated with product said to exhibit superior film integrity and adhesion, easy brushing, sheen uniformity and scrub resistance.

Product Development Dept., Colton Chemical Co., A Division of Air Reduction Co., Inc., Dept. PVP, 1747 Chester Ave., Cleveland, Ohio.

POLYMER GUM
Bacteriostatic

A polymer gum not subject to bacterial or enzymatic decomposition is now being made commercially. Said to prevent other components from decomposing, losing strength and developing bad odors.

Gum is water-white and practically odorless, with melting range of 59-80 degrees C. Will dissolve in cold water in all proportions to give non-viscous, neutral clear solutions. Also soluble in methyl and ethyl alcohols, ethyl acetate, methylethylketone, chloroform, methylene chloride and hot glycerin. Insoluble in aromatic and non-polar solvents.

Product, called DMHF, may be used for temporary protective coatings on metal ware, and for permanent coatings for textiles and paper. Can also be used in water paints, mold binders, pigments, abrasives, adhesives and ink.

Glyco Products Co., Inc., Dept. PVP, Empire State Building, New York 1, N. Y.

HYDRAULIC HAND LIFT TRUCK
In Popular Price Class

Hydraulic hand lift truck in "popular price class" requires only six strokes of handle to lift 2500-pound load full lifting height of three inches.

Companion model has 4000-pound capacity. Both models available in narrow and wide types, with a range of platform lengths. Trucks said to be of rugged construction, with parts heat-treated to assure long service life.

Barrett-Cravens Co., Dept. PVP, 628 Dundee Road, Northbrook, Ill.

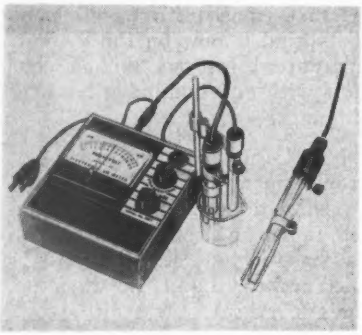
pH METER
Readings to 0.1 pH Unit

Line-operated pH meter Model 85 suited for pH tests and titrations has been placed on the market.

Compact instrument has scale three inches long covering complete pH range from 0 to 14. Can be easily read to an accuracy of 0.1 pH unit. Furnished either with individual glass and calomel electrodes or with probe electrode, a combination of glass and calomel.

Suitable for acidimetric, oxidation-reduction and dead-stop titrations. Stabilized for wide range of line voltage fluctuations, unaffected by line frequency variations. Suited for continuous service.

Photovolt Corp., Dept. PVP, 95 Madison Ave., New York 16,



PHOTOVOLT

MOISTURE ANALYZER
For Solid Materials

High-speed moisture analyzer said to reduce analysis time from four hours required by conventional methods to thirty seconds to four minutes. Makes quantitative determination of moisture content in a wide variety of solids.

Analyzer, Model 104, operates on principle of nuclear magnetic resonance. Does not alter sample in any way. May be operated by unskilled technician once calibrated, according to manufacturer. Large sample size (40 cc) insures true representation.

Schlumberger Well Surveying Corp., Dept. PVP, Ridgefield, Conn.

POURING DEVICE
Allows One-Hand Pouring

New device called "Tippa Can Holder" has been developed for pouring liquids or solutions from five-gallon cans.

Pivoted cradle-type, all-steel unit with tilting action fits and securely holds all standard five-gallon cans. Designed for one-hand pouring. Construction of 1/8 inch steel bar stock. Cans clamped by circular band tightened with wing nut. Double A-frame legs may be folded for storage.

Litho Research, Inc., Dept. PVP, 2417 Second Ave., Seattle 1, Wash.

LITHO

SEAMLESS CANS
Different Shapes and Sizes

Plain seamless cans in different shapes and sizes are available from stock or made to order.

Cans are lightweight, said to prevent leakage. Available in flat, deep and special deep sizes, with inside curl, full open screw top, flanged edges and compound lined tops for hermetic sealing. Single friction type cans also available.

George D. Ellis & Sons, Inc., Dept. PVP, American & Luzerne Streets, Philadelphia 40, Pa.

TEMPERATURE INDICATOR
In Four Ranges

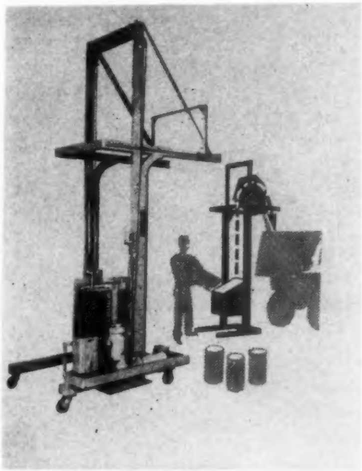
Rapid fluid temperature measurements can be made at closely differentiated points in a volume of material with fluid temperature indicator, Model CTL.

Instrument combines indicating meter with stainless steel probe 12 inches long attached to a 30-inch length of flexible armored cable. Variations in design of probe and cable available for special purposes.

Meter is housed in compact hand-held enclosure with protective cover. Only extreme tip of probe is heat sensitive, making possible exploratory measurements throughout entire volume of a liquid. Response of indicator is approximately two seconds, with accuracy

of five per cent or better. Automatic compensation for ambient temperature variations included.

Available in ranges of 0-300, 0-450, 0-650, 0-1000 degrees F. from Royco Instruments, Dept. PVP, 720 Arthur St., Albany, Calif.



LANGLEY

POWER DUMPER
Rear Load-Front Dump

Model 54 PowRdumper designed for loads up to 750 pounds and featuring rear loading and front discharge operation has been introduced.

Model 54 lifts to height of eight feet, may be engineered to meet special applications. Either in portable or stationary models, both able to handle any type of container. Semi or fully automatic controls furnished where specified.

Two other models also available, Model 32 for side dumping of loads from 2,000 pounds at any height, and Model 36 for front dumping loads of more than 750 pounds from any height.

Langley Mfg. Co., Dept. PVP, 920C Cambridge St., Cambridge 41, Mass.

PETROLEUM SOLVENTS
Three Different Types

Three petroleum solvents have been announced, all in the mineral spirits distillation range.

Shell-Sol 36 is suggested for special purpose industrial finishes. Said to evaporate twice as fast as conventional solvents.

Shell-Sol 14 is recommended for interior architectural finishes to enhance wet edge characteristics. Said to evaporate completely, but more slowly than conventional mineral spirits.

Shell-Sol 71 is a completely odorless, alkylate-type petroleum thinner. Said to evaporate more slowly than conventional mineral spirits, and is recommended for manufacture of high quality odorless interior architectural finishes, flat wall paints, varnishes and enamels.

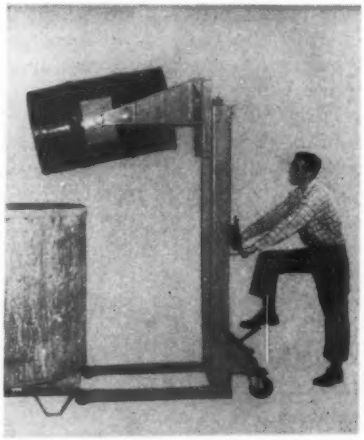
Shell Oil Co., Dept. PVP, 50 W. 50th St., New York 20, N. Y.

DRUM HANDLER
Hydraulically Operated

A one man controlled, hydraulically operated drum handler which will elevate a drum 56 inches in vertical position and 63 inches for pouring is on the market.

Unit is only 78 inches in height. Easily tilted, the drum extends 10 inches over lip of tank when in pouring position. Large wheels make the unit easy to handle for pouring, stacking, tiering, loading and unloading.

Hamilton Equipment Co., Inc., Dept. PVP, 31 Beckwith Ave., Paterson, N.J.



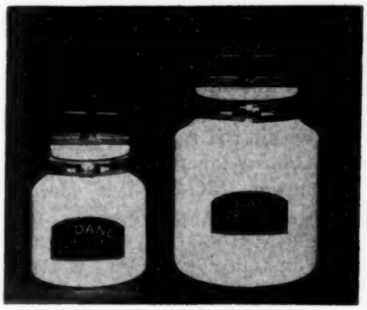
HAMILTON

ANTIFOAM AGENTS
In Flake or Powder Form

Instant antifoams in flake or powder form are added to water in concentration called for by processing requirements. Said to emulsify immediately after addition to water, with emulsion remaining stable for long periods of time.

One 25-pound bag of instant antifoam said to produce the equivalent of ten 55-gallon drums of conventional liquid antifoam. Instant HC-300 antifoams are packaged in exact weight and quantity user needs for emulsion.

Hodag Chemical Corp., Dept. PVP, 7247 North Central Park, Chicago 45, Ill.



McDANEL

LABORATORY MILL JAR
High Alumina Body

Special purpose, high alumina body laboratory mill jar has been designed for high batch purity, low pickup and minimum contamination.

Called AVJ-1G (one-gallon size) and AVJ-1Q (one-quart size), product has bronze hardware and rubber or neoprene gaskets. Jar has body of 96 per cent Al_2O_3, and MOHS hardness of 9.

McDanel Refractory Porcelain Co., Dept. PVP, Beaver Falls, Pa.

HYDROCARBON EMULSION
Wide pH Stability

Piccopale Emulsion A-22 has been developed to meet demand for anionic emulsion exhibiting superior stability in low pH systems. Features high melting point of emulsion solids and wide pH stability.

Suggested as co-binder in latex paints, clay coatings, textile coatings and adhesives. Said to be compatible with polyvinyl acetate, acrylic resin emulsions, neoprene and styrene butadiene.

Said to provide pigment binding, soil removal at high pigment volumes, resistance to soap, water, acids and alkalies, compatibility with thickeners and protective colloids, retained flexibility, good adhesion, packaging and mechanical stability, uniform particle size, reduced formulating costs and reduced can corrosion.

Pennsylvania Industrial Chemical Corp., Dept. PVP, Clairton, Pa.

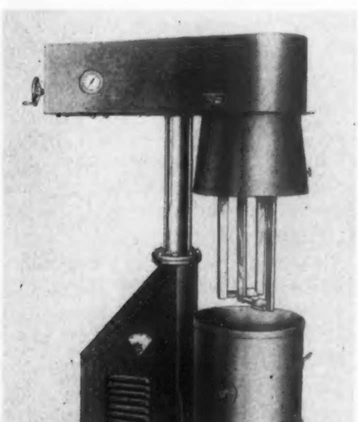
WETTING AGENTS
Hard Water Resistant

Monawet MO-70% is the sodium salt of the di-(2-ethylhexyl)-sulfosuccinic acid. Useful where surface tension depressing factors are needed, as in preparation of dispersions, emulsions and similar operations.

Said to be powerful wetting agent. Produces unstable foam which subsides quickly. Indefinitely stable in cold or hot water solutions, good stability in solutions within pH range from two to nine. Shows low order of toxicity.

Monawet MO-80% is closely related to Monawet MO-70%, but possesses better hard water and salt resistance. Poorer wetting agent and less soluble in polar and non-polar organic solvents. Chemically the sodium salt of di-hexyl-sulfosuccinic acid.

Mona Industries, Inc., Dept. PVP, Paterson 4, N. J.



CHARLES ROSS

CAN MIXERS
Double Planetary Action

Series of heavy duty changeable can mixers has been developed for shearing and dispersing action in mixing paste materials.

Available in sizes from one to 150-gallon working capacities, mixers employ intensive double planetray mixing action said to reduce mixing time to minimum. Simplified vertical hydraulic lift featured for ease in cleaning stirrers.

Close clearance between stirrers and between stirrers and can said to produce 12 points of intensive compressive and shearing action during each revolution. Non-rotating can completely enclosed during mixing for maximum safety.

Charles Ross & Son Co., Dept. PVP, 148 Classon Ave., Brooklyn 5, N. Y.

VAPOR PHASE ANALYSER
For Gas Chromatography

A low-priced vapor phase analyser for gas chromatography which is said to perform virtually all operations of more costly instruments has been developed.

Instrument is housed in cylindrical oven. Helium, nitrogen, hydrogen, dried air and other carrier gasses may be used. Contains Gow-Mac diffusion type thermal conductivity cell as detector. A 0-2 mv recorder may be used for most sensitive work.

Power requirement is 500 watts at 110 volts a.c. Central Scientific Co., Dept. PVP, 1700 Irving Park Rd., Chicago 13, Ill.

DISPERSING AGENT
Stability Over Wide pH Range

Clear, color lessdispersing agent called "Daxad 30" has been introduced. Said to have minimum foaming tendencies and low viscosity.

Product is also said to be particularly effective for dispersing pigments in water systems and for use where freedom from eventual discoloration is important. Stability over a wide pH range is claimed, and small amounts are said to produce fluid pigment dispersions.

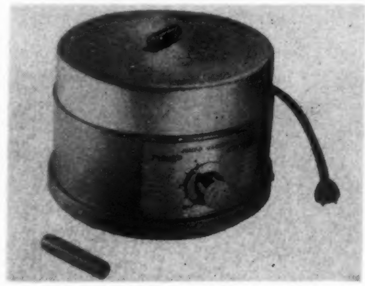
Immediate shipments in commercial quantities. Dewey and Almy Chemical Co., Dept. PVP, 62 Whittemore Ave., Cambridge 40, Mass.

MAGNETIC STIRRER
Handles up to 3 Gallons

Magnetic stirrer has been developed to handle liquids of wide viscosity range in quantities up to three gallons. Any glass, porcelain, nonmagnetic metal or plastic vessel may be used, open or closed, or sealed under vacuum or pressure.

Instrument utilizes magnetic lines of force, eliminating contaminant-collecting shaft and impellers of mechanical stirrers and permitting full access to top of container.

Unit said to be wobble-proof. Body is anodized aluminum. uses 115-volt 50/60-cycle a-c. Available from Fisher Scientific Co., Dept. PVP, 384 Fisher Building, Pittsburgh 19, Pa.



FISHER

PAINT GRIND GAUGE
Contains Three Scales

Paint grind checking gauge consists of engraved stainless steel gauge block and wiper. Both said to be precision ground to fine tolerances.

To check grind of paint, small quantity is placed in deep vertical grooves of gauge block. Wiper is moved across gauge block, wiping paint from deep end of grooves to shallow end. Fineness of grind is determined by reading one of three engraved scales on gauge block.

Three scales are: Pacific Coast Standard, Mills and National Standard. Available from Schoeny Tool Co., Dept. PVP, 7407 Havenhurst, Van Nuys, Calif.

SCHOENY

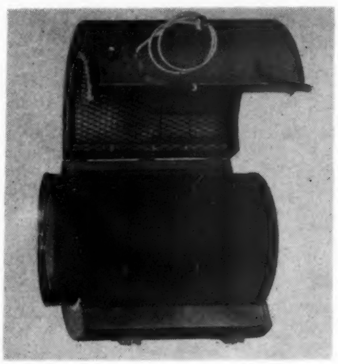
PHENOLIC RESIN
Light Color

A light-colored phenolic resin has been developed for use in surface coatings, said to demonstrate superior resistance to alkalis and acids and lower cost when compared to conventional phenolic resins.

Products utilizing Resin #3725 can be pigmented to a wide range of hues because of light color. Long storage does not affect stability or drying time, according to manufacturer.

Product is based on a modified phenol, and supply is said not to be subject to frequent shortages ex-experienced in production of phenols based on by products. Resin #3725 is a non-heat-reactive oil-soluble resin.

Barrett Division, Allied Chemical & Dye Corp., Dept. PVP, 40 Rector St., New York 6, N. Y.



PALMER

DRUM WARMERS
In Four Sizes

Palmer drum warmers now available in 14, 16, 30 and 55-gallon drum sizes. All models have automatic temperature control in choice of two ranges: from 100 to 450°F., or from 60 to 250°F.

Two smaller sizes come in 1500 watts, 115 volt capacity only, while two larger sizes are furnished in 1500 watts, 115 volts, or 3200 watts for all voltages and phases from 208 volts up to 550 volts, three phases.

Well-insulated hinged halves fit around drum with a flexible top gasket allowing for variations in drum diameters, yet assuring snug fit and preventing heat loss. Warmers said to be adaptable to almost any type of drum warming. Can also be used in combination with mechanical agitators.

The Harold L. Palmer Co., Dept. PVP, 2980 W. Davidson Ave., Detroit 38, Mich.

HIGH-SHEAR VISCOMETER
Rotational Type

Rational type high-shear viscometer has been developed to evaluate brushability of paints.

Viscometer consists of cylindrical cup in which is suspended a closely fitting cylindrical bob. Small uniform clearance of approximately four mils between rotor and stator surfaces is maintained by flexible suspension device consisting of a pair of universal joints.

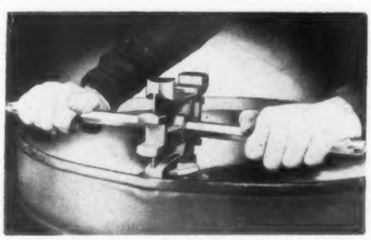
Driving weight to produce force necessary to overcome drag created by paint sample between two surfaces is measure of ease of brushing. Two wells included in walls of cylindrical cup produce discontinuity approximating that to be found between bristles when brush strokes are produced by hand. Cup is water-jacketed and connected to circulating water bath to maintain constant temperature of 77°F.

Gardner Laboratory, Inc., Dept. PVP, Bethesda 14, Md.

STEEL DRUM WRENCH
For Many Types of Fittings

"All-Plug" wrench is said to service more than 100 kinds and sizes of American or foreign plugs, bungs or fittings on steel drums.

Construction is such that runner bands or chimes of drums do not interfere with workman's knuckles. Small drain plugs may be spun in or out with sockets at each end of slide bar. Workhead may be positioned at center of bar, or at either end for greater leverage.



SCHINKER

Constructed of 4½" diameter four-pronged steel workhead fitted to ⅝" x 18" hexagon steel slide bar. Weighs three and one half pounds. Available with spark-proof bronze workhead or bronze workhead with bronze slide bar.

Michael A. Schinker Mfg. Co., Dept. PVP, 6514 S. Western Ave., Chicago 36, Ill.

SELF-SANITIZING ADDITIVE
Fights Fungi and Bacteria

Self-sanitizing paint additive said to have long-lasting killing action against both fungi and common disease-producing bacteria has been introduced.

Called "Nuozene," additive is said to be effective in most types of paint formulations, lasting for the life of the paint, and requiring no special precautions in handling. Product is a complex organic chemical compound of the triazine family.

Nuodex Products Co., Dept. PVP, Elizabeth, N. J.

BLUE TONER
Phthalocyanine Type

Phthalocyanine Bahama Blue BA-4561 is full-strength toner which is non-flocculating in a wide range of air-dry enamels, industrial baking enamels and lacquers. Is also non-crystallizing.

Material claimed to be superior in flocculation resistance not only to previous toners, but also to specially resinated blues and extended materials heretofore offered for that purpose. Material has advantage of eliminating extenders which may cause undesirable physical changes in enamel or lacquer formulations.

Also claimed is unusually soft texture for a phthalocyanine blue toner. Said to reach full strength development with considerably less grinding than required by other toners.

Standard Ultramarine & Color Co., Dept. PVP, Huntington, W. Va.

ALKYD EMULSION
For Water-Thinned Gloss Paints

An alkyd emulsion designated 1505 Synthemul, is said to offer better adhesion, better water resistance and greater mar resistance than other water-thinned gloss architectural finish vehicles.

Properties approximating those of solvent-thinned gloss paints are claimed to be made possible.

Coatings containing the emulsion are said to have same advantages of other emulsion paints. They are self-priming, maintain a uniform gloss over surfaces of varying porosity, set to touch in 30 minutes and dry tack-free overnight. Coverage and brushing qualities are said to be excellent.

1505 Synthemul may be used by itself or, for improved color retention and speed of dry, may be used in combination with vinyl acetate emulsions. Good gloss

said to be obtained with pigment volume concentrations of 16 to 27 per cent.

Reichhold Chemicals, Inc., Dept. PVP, RCI Building, White Plains, N. Y.

TABLE TRANSFER STAND
Gravity Conveyor Junction

"Traffic Circle" ball table transfer stand has been developed for use as junction for two, three or four gravity conveyor lines. Said to permit easy routing of objects from one line to any of others.

M-H STANDARD

Also said to be useful where desired to cover a broad area by shifting a gravity conveyor, acting as a variable angle gravity curve. Consists essentially of circular ball table caster on three adjustable legs. Four support brackets accommodate gravity conveyors up to 18 inches wide.

Model for outdoor use or where equipment must be washed or steam cleaned contains nylon seated ball casters with all metal parts zinc coated. M-H Standard Corp., Dept. PVP, 513-521 Communipaw Ave., Jersey City 4, N. J.

PAINT ADDITIVE
Protects Against Freezing

Small quantities of new chemical are said to protect paints against freezing temperatures.

Armeen SZ, a formulated alkaline metal salt of N-coco beta amino butyric acid, is said to be effective with both oil-modified and oil-free paints. In former, stabilization is said to be obtained with as little as 0.32 per cent of the chemical based on a finished paint containing 12 per cent latex solids. Slightly higher concentration recommended for oil-free latex paints.

Available in commercial quantities, stabilizer is effective through a minimum of four freezes at minus 10°F. with no detrimental effect on scrubability of dried paint film. Also contains bactericidal qualities useful in formulations containing protein materials.

Armour & Co. Chemical Division, Dept. PVP, 1355 W. 31st St., Chicago 9, Ill.

DRUM HANDLING
Automatic Mechanical System

Eight drum handling attachments requiring no hydraulic systems are now in production.

V-1 Vert-O-Matic handles one 30 or 55-gallon drum, while the V-2 model handles two drums. Both are attached to apron of lift truck. The V-2-V handles two drums, one atop the other, the V-S-AS handles two 55-gallon drums and spots one at a time, and the V-3-SS handles three 55-gallon drums, spotting one at a time.

The V-1-DF is a detachable foot permitting the handling of smooth metal and fibre drums which have no heavy beads or rolling hoops. An unusual feature of the V-1-F and the V-2-F, which handle one and two 30 or 55-gallon drums respectively, is that they may be used for intermittent handling of drums, as they easily slip on or off the end of the regular forks of the lift truck.

LITTLE GIANT

Little Giant Products, Inc., Dept. PVP, 1530-55 N. E. Adams St., Peoria, Ill.

SYNTHETIC RESIN
Chemically Neutral

Piccoflex is newest addition to line of synthetic resins. Available in three grades in solid form.

Properties include: chemical neutrality; resistance to kerosene, gasoline, mineral and vegetable oils, water, acid and alkalies; toughness; pigment wetting, and color stability.

Now also being supplied as fifty per cent solution in HiSolv Spirits, which is said to eliminate need for inventory of additional raw materials, simplify handling, reduce labor costs and accelerate processing time.

Among applications suggested are: traffic and exterior masonry paints, overprint varnishes and greaseproofing finish or cardboard by spray.

Pennsylvania Industrial Chemical Corp., Dept, Clairton, Pa.

GRAVITY TRANSMITTER
For Continuous Measurement

Differential converter transmitter with range continuously adjustable from 0-5 to 0-25 inches of water, is adaptable to continuous measurement and control of specific gravity of liquids in open vessels.

Instrument may be used in several methods of measurement which have been found satisfactory.

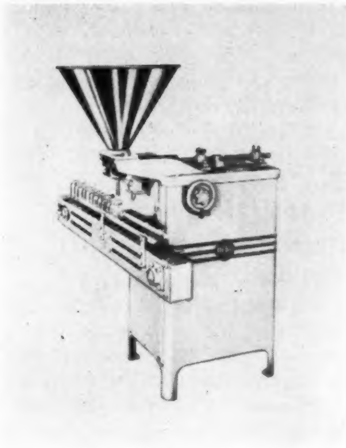
Minneapolis-Honeywell Regulator Co., Industrial Division, Dept. PVP, Wayne and Windrim Aves., Philadelphia 44, Pa.

FILLING MACHINE
For Short to Medium Runs

A single-piston filling machine has been designed for small firms utilizing short to medium production runs. The new unit is described as an automatic single line machine with cross conveyor.

Designated 15 MS 1, machine has cross conveyor synchronized with filling cycle of the single-piston unit. Special index positioning arm causes containers moving along conveyor to stop directly under filling nozzle.

Quantity deposited is regulated by micrometer-type adjustment so machine may be set to fill quantities from one ounce to one half gallon.



HOPE

Hope Machine Co., Dept. PVP, 9400 State Rd., Philadelphia 14, Pa.

PLASTICIZER
For Vinyls

A low temperature plasticizer for vinyls called Plastolein 9078 has been placed on the market.

Product said to have been designed to meet need for low cost plasticizer in adipate price range. Said to offer better low temperature flexibility than adipates, as measured by Masland Impact and Clash-Berg tests.

Higher efficiency and substantially greater compatibility than adipates are claimed. Said to impart higher tensile strengths at efficiency concentration, lower oil extraction and lower volatility.

Emery Industries, Inc., Dept. PVP, Carew Tower, Cincinnati 2, Ohio.

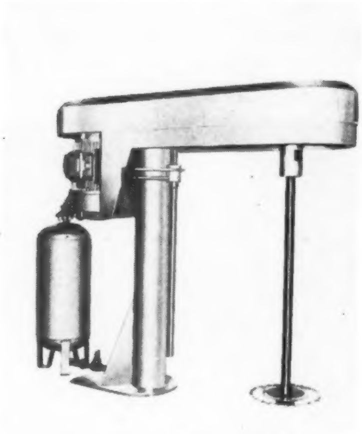
DISSOLVERS
Increased Mixing Power

Two large size production dissolvers with increased mixing power and flexibility have been introduced.

Model 510VHV large capacity mixer is designed to bring variable speed to big batch mixing. Enables operation at optimum speeds from 900 to 2100 rpm to handle a wide variety of mixing and dispersing problems. Unit powered by 7½ or 10 hp motor, and has hydraulic lift for 42″ maximum rise.

Model 720VH is siad to be largest capacity lift-type mixer yet developed. Makes possible application of 20 to 40 hp 1800 rpm motors for handling large volume and high viscosity batches in small working area. Speed range of impeller-shaft is 900 to 1500 rpm, while hydraulic lift allows 48″ maximum rise. Weight of unit is 2000 pounds.

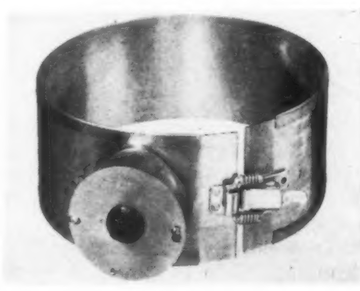
Morehouse-Cowles, Inc., Dept. PVP, 1150 San Fernando Rd., Los Angeles 65, Calif.



MOREHOUSE-COWLES

HEATING ELEMENT
For Containers

Wrap-It-Heet PH-5 container heating element has been designed for industrial plants and small shops. Heating element is for use on standard five-gallon straight side steel pails or containers approximately 11¼″ in diameter.



ACRA

Product may be used to heat or melt waxes, resins, adhesives, oils and non-volatile chemicals requiring heating to facilitate melting or removal from container.

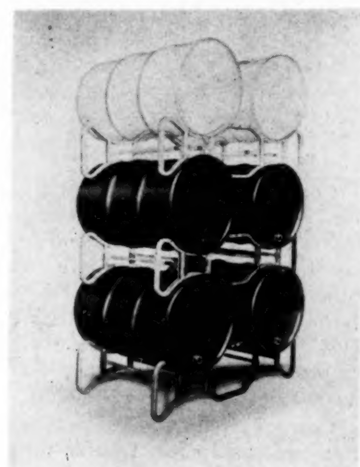
Three-heat switch is mounted on conventional outlet box which protects all live terminals and permits wiring in accordance with accepted electrical standards.

Acra Electric Corp., Dept. PVP, 9909 Pacific Ave., Franklin Park, Ill.

BARREL RACK
Flexibility of Handling

Steel rack is said to permit for the first time handling of loaded or empty barrels and drums with standard fork lift truck.

Drum rack supports two loaded barrels and makes easy the stacking of pairs of containers to any practical height. Flexibility of handling and storage is provided because individual drums may be moved without excessive handling of other drums in stack.



REPUBLIC STEEL

Barrel racks are constructed of heavy gage channel steel. One unit supports 7,500 pounds in 18 gage drums and 14,000 pounds in 16 gage drums. Racks are enameled to offset rusting.

Pressed Steel Division, Republic Steel Corp., Dept. PVP, 6100 Truscon Ave., Cleveland, Ohio.

FATTY ALCOHOL ESTER
For Lacquers

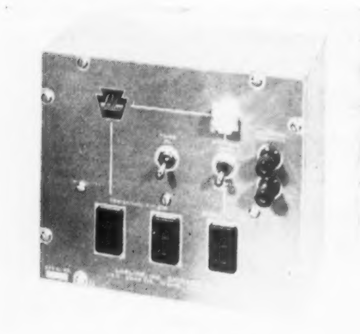
Hywax 135, fatty alcohol ester said to be water white and extremely heat stable, has been introduced.

Product said to change color very little when heated to 290°C. and to stand prolonged heating at fairly high temperatures. Also said to have little odor, to be nonvolatile and not to oxidize or change when exposed to heat, light and air. Suggested for lacquers.

Werner G. Smith, Inc., Chemical Division, Dept. PVP, 1730 Train Ave., Cleveland 13, Ohio.

ELECTRONIC CONTROL BOX
For Process Control

Electronic control box features new electronic circuit with improved operating characteristics. Said to be ideal for mercury-in-glass regulator.



LABLINE

Control box has three plug-ins for controlling heaters, stirrers, alarm circuit, liquid level controls, constant temperature bath and other process controls. Duplex terminals connected to control circuit such as liquid level controller or sensitive mercury-in-glass regulators.

Control circuit said to pull only five microamperes. Double-throw switch provides automatic changing from normally open to normally closed circuits. No wiring changes needed. Total load capacity 1500 watts.

Labline, Inc., Dept. PVP, 3070-82 W. Grand Ave., Chicago 22, Ill.

CITRACONIC ANHYDRIDE
For Curing Epoxy Resins

Citraconic anhydride, a low molecular weight liquid anhydride, has been introduced in research and pilot plant quantities.

Product said to be promising in curing epoxy resins, preparing polyester resins and serving as a chemical intermediate. Citraconic anhydride may be combined with alcohols to form monoesters.

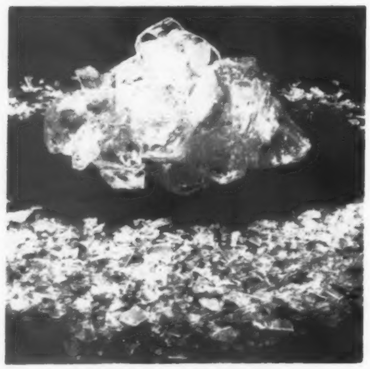
Diesters, prepared by the anhydride's reaction with an excess of alcohol and an acid catalyst, may be copolymerized with vinyl chloride, vinyl acetate, styrene and ethyl acrylate. Product may also be used to prepare monoamides from primary amines.

Chlorine and hydrogen will add to double bond, and the anhydride may be hydrogenated to methyl succinic anhydride. Will also undergo Diels-Adler reaction with dienes, according to manufacturer.

Commercial Development Division, Charles Pfizer & Co., Inc., Dept. PVP, 630 Flushing Ave., Brooklyn 6, N. Y.

SILICONE INTERMEDIATE
Improves Gloss Retention

Silicone intermedite that may be polymerized with a variety of organic resins is now available in commercial quantities.



DOW CORNING

Identified as Z-6018, product may be chemically combined with most paint resins to produce finished films with improved color and gloss retention, weatherability, moisture resistance, heat stability and wet and dry electrical properties, according to manufacturer.

Product is shipped in form of dry transparent flakes. Said to produce easier resin polymerization by making more precise concentrations possible and by eliminating a potential subsequent solvent removal step. Also said to lend added lubricity during pigment grinding.

Dow Corning Corp., Dept. PVP, Midland, Mich.

PORTABLE PRINTING DEVICE
For Printing Five-Gallon Cans

A portable printing device for quality printing on five-gallon cans has been developed. Said to be a low-cost process.

Machine handles up to 500 cans per hour with one inexperienced operator. Will produce lithographic quality printing, according to manufacturer. Cost is said to be less than that of paper labels, silk screening or stenciling.

Called "Print-A-Can," printer will handle all types of five-gallon cans, bail and tite-head, with or without rolling hoop. Machine weighs 160 pounds. Operation is mechanical, requires no electric or air power. Printing area is 9" x 14".

Metal Products Division, Chapman Chemical Co., Dept. PVP, Memphis 1, Tenn.

THREE-ROLLER LAB MILL
High-Speed

High speed three-roller mill for laboratory or pilot scale use has been designed to give same results as larger roller mills.

Ross #52LC 4½" x 10" mill is constructed of similar materials as larger models, Mill may be readily converted to either fixed center roll operation or floating center roll operation with simplified two point control.

CHARLES ROSS

Mill features built-in quick roll release for loosening rolls for cleaning and returning to exact original setting. May be used for small batches or limited production for eight or more hours per day in addition to laboratory work.

Improved mounting bench is completely enclosed with storage shelf, and pivotted can holder is adjustable for various sized cans.

Charles Ross & Son Co., Dept. PVP, 148-156 Classon Ave., Brooklyn 5, N. Y.

LIGHT ABSORBERS
Protect Against Radiation

A family of light absorbers for use in products affected by ultraviolet radiations from the sun has been announced.

Light absorbers include Salol phenyl salicylate), TBS (tert-butyl phenyl salicylate), HCB (5-chloro-2-hydroxy-benzophenone) and DBR (dibenzoylresorcinol). All four are said to be used in commercial formulaions, but only Salol has previously been sold to the trade.

Combinations of absorbers are available for specialized applications. The Dow Chemical Co., Dept. PVP, Midland, Mich.

POWER STEERING
For Pneumatic Tire Trucks

Power steering for Hyster series of pheumatic tire trucks in 3,000, 4,000 and 5,000-pound capacity range now available as optional equipment.

Fast, immediate and dependable steering action said to be assured because of use of flow divider in hydraulic system which always directs fluid first to power steering unit. Power steering may be installed at factory or by field installation.

Hyster Co., Dept. PVP, Danville, Ill.

ANTIFOAM AGENT
For Coatings and Adhesives

Antifoam and leveling agent said to be effective for systems based on starches and dextrines, natural proteins and synthetics has been developed.

Said to be capable of replacing tri-butyl phosphate in many formulations at substantial savings in cost. Called "Antifoam TBX," product may be used as received or in the form of a dilute water emulsion. May be added during mixing or milling operations or to finished coatings to prevent fish eyes or pin holes when applied.

Quantity to be used varies with each system and method of preparation. Suggested starting point of 0.1 per cent by weight may be gradually reduced until optimum concentration is reached.

Hodag Chemical Corp., Dept. PVP, 7247 N. Central Park, Chicago 45, Ill.

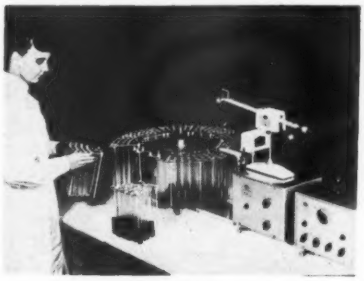
FRACTION COLLECTOR
Building-Block Design

Automatic fraction collector called RadiRac, has been designed to take 240 tubes directly in one turntable disk, or in ten individual groupings of 24 tubes each.

RadiRac is of building-block design, which allows researcher to add sub-units as work or budget indicates. Basic assembly can collect fractions from one to four columns on a pre-set time basis. Pre-set time and pre-set volume collection made possible by adding related sub-units.

Uninterrupted collection for indefinite period made possible by design of separate tube racks. Batch handling also said to be facilitated by design.

RadiRac is imported from LKB-Produkter of Sweden. Available from Ivan Sorvall, Inc., Dept. PVP, Norwalk, Conn.



RADIRAC

TRANSFER AND SUPPLY PUMP
For Dispensing Chemicals

Light-weight, 1:1 ratio transfer and supply pump for use on either open top or bung-type drums has been announced.

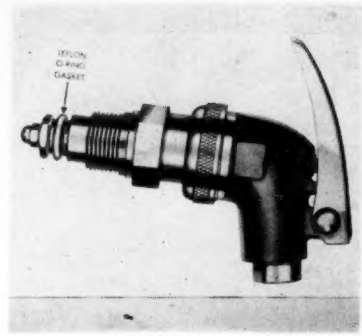
Pump may be used for quick dispensing of chemicals, solvents, lubricants, dyes and oils. "Rapid-Flow" pump said to handle chemicals and inflammable fluids safely. Lever-type control valve starts or stops pump when lever is sqeezed or released.

High-volume pump said to be easily adaptable to 120-pound and 400-pound drums and original containers. Pump operates on air pressures as low as 30 pounds. Said to deliver up to 20 gallons per minute of No. 20 motor oil with 150 pounds pressure.

Beeson-Reichert, Inc., Dept. PVP, Toledo Trust Building, Toledo 4, Ohio.

DRUM FAUCET
Leak-Proof, Self-Closing

Safety drum faucet which is said to prevent leaks and accidental discharge has been developed.



PROTECTOSEAL

Spring located within body maintains liquid-tight closure at all times. Hand pressure on lever-type handle necessary to push back spring and permit flow of liquid. Valve closes automatically.

Kel-F or Teflon O-ring gasket is used to withstand destructive action of chemicals which deteriorate synthetic rubber gaskets. O-ring construction said to use positive wedging seat action which forms tight seal to avoid gasket leakage due to swelling, shrinking or cracking.

Protectoseal Co., Dept. PVP, 1920 S. Western Ave., Chicago 8, Ill.

CHEMICAL INHIBITOR
Prevents Container Corrosion

Development of a chemical inhibitor which prevents container corrosion caused by water base paints has been announced.

Product, called Nox-Rust 702, employs both contact and volatile water soluble inhibitors, protecting containers above and below liquid level. Said to be more effective at cheaper cost than other rust inhibitors on the market.

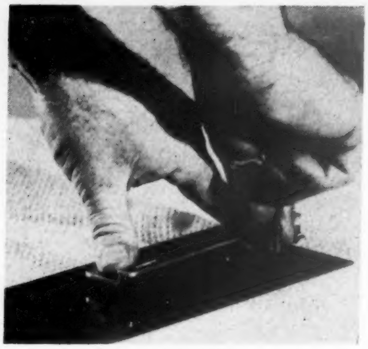
Daubert Chemical Co., Dept. PVP, Chicago 1, Ill.

SCRATCH-HARDNESS TESTER
Also Tests Adhesion

Testing instrument provides a means of accurately studying scratch-hardness vs. adhesion properties of organic protective coatings systems.

Each stroke of sliding scratcher-tip yields film index that is reproducible within close limits and can be handled statistically.

Scratch tester said to provide convenient means of studying cure



GARDNER

time of coatings. Also possible to rate adhesion of finish coats to their primers, adhesion of entire coating system to substrate and effectiveness of surface cleaning and preparation of substrate prior to application of coating system.

Gardner Laboratory, Inc., Dept. PVP, 5521 Landy Lane, Bethesda 14, Md.

STYRENE RESIN
For Gold Bronze Vehicles

Modified styrene resin for use in gold bronze vehicles is being produced. Product is called Piccolastic Bronze Vehicle.

Resin is said to be completely neutral and unreactive, and to have excellent color stability to heat and ultra-violet exposure. High viscosity solution is non-gassing with all available bronze pigments, and shows no tendency to gel on storage.

Also available is Picco Resin 420-ES, a polyindene resin for aluminum paints. Product said to provide improved retained leafing, can stability and excellent tolerance for ordinary petroleum thinners, and is said to be non-gassing.

Resin produced in flaked, solid or solution form. Compatible with drying oils, bodied oils, alkyds and oleoresinous varnishes.

Pennsylvania Industrial Chemical Corp., Dept. PVP, Clairton, Pa.

VISCOMETER
For Pipe Line Measurements

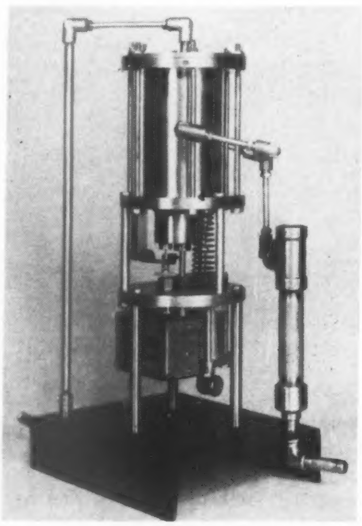
Viscometer measuring element determines viscosity under existing pressure conditions when a side stream is established to allow a small sample to flow through.

Measured viscosity information electrically transmitted to viscometer recorder. Temperature of product as it enters viscometer measuring chamber may also be measured.

Pneumatic temperature compensation may also be obtained. Pneumatic transmitter provides air output which is a function of viscosity. Air signals from viscometer and temperature transmitters fed into pneumatic computing relay which measures viscosity compensated for temperature.

Heat exchanger may be installed in side stream when necessary to bring temperature of product within range of compensation.

Norcross Corp., Dept. PVP, Newton 58, Mass.



NORCROSS

ACRYLIC EMULSION
For Water-Based Paint

Polyco 2719, acrylic copolymer emulsion, has been developed for optimum performance as a vehicle in water-based paints.

Copolymer composition and emulsifying and protective colloid system said to have been selected with particular attention to clearness, colorlessness, non-yellowing, stability to heat and sunlight, and water resistance.

Product said to take full advantage of all properties of acrylic polymers, while it imparts outstanding brushing and leveling properties. May be employed in conventional acrylic paints without reformulating.

Among advantages are: excellent mechanical stability, storage stability and freeze-thaw stability; better leveling, in casein-stabilized systems; outstanding color and sheen uniformity; more economical color development; superior non-yellowing characteristics, and excellent resistance to water spotting.

The Borden Co., Chemical Division, Dept. PVP, 350 Madison Ave., New York 17, N.Y.

ACRYLIC EMULSION
For Hard Films

A film-forming acrylic emulsion said to produce hard, tough films which must be dried at elevated temperatures to become continuous, has been introduced.

Called Rhoplex C-72, the product is said to produce clear, colorless films which remain so upon aging. Also useful to modify softer emulsions to produce clear or lightly-pigmented films of intermediate hardness, good gloss and block resistance.

Product said to form film on non-porous substrates at approximately 39°C. Film-forming temperature less predictable on porous substrates. Film from unmodified Rhoplex C-72 has Tukon hardness of 4.3.

Emulsion may be blended with other acrylic emulsion polymers to reduce film-forming temperature and/or increase hardness.

Rohm & Haas Co., Dept. PVP, Resinous Products Division, Washington Square, Philadelphia 5, Pa.

WATER SOLUBLE RESINS
High Molecular Weight

An unusual class of water soluble resins with properties ideally suited for industrial application has been developed.

Trade-marked Polyox, resins are high molecular weight polymers of ethylene oxide. Resins are completely soluble in water at low concentrations, have great thickening power. Other properties are resistance to biological attack, resistance to oils and greases, low moisture pickup in dry form and compatibility with other types of polymers such as starch and polyvinyl acetate.

Among suggested uses are adhesive formulations and water-soluble films. Polyox resins are produced as white granules in four grades with a range of molecular weights: WSR-35, WSR-205, WSR-301 and WSR-701.

Union Carbide Chemicals Co., Dept. PVP, 30 E. 42nd St., New York 17, N.Y.

ALKYD EMULSION
For Interior Paints

Alkyd resin water emulsion called Cyaqua has been made commercially available as an improved ingredient for interior wall paints.

Product said to combine advantages of solvent type alkyd flat enamels and latex type enamels. Paints made with the emulsion are said to be easy to apply, and free of organic solvents and accompanying odors. Brushes can be cleaned with ordinary water when paint is still fresh.

Paints made with Cyaqua said to have high hiding power, high scrub resistance, and to give control of sheen down to a dead flat finish. Paints contain no casein or other protein subject to decomposition. Non-yellowing white and full range of colors can be made with the alkyd water emulsion.

American Cyanamid Co., Dept. PVP, 30 Rockefeller Plaza, New York 20, N.Y.

POLYURETHANE PRODUCTS
1 and 2 Component Systems

A polyurethane product series including fully reacted and prepolymer types has been introduced commercially.

Product line called "Spenkels" consists of polyurethane materials for coatings. Group includes a one-component, stable coating vehicle said to have reliable shelf life, and a series of two-component system materials in which one part is pre-polymer and other is catalyst.

Products said to produce coating films that are excellent in durability and corrosion resistance. Variety of applications suggested, including coatings for industrial equipment and plant buildings, marine paints, wire coatings and architectural finishes.

Spencer Kellogg and Sons, Inc., Dept. PVP, Technical Science Dept., Buffalo 5, N.Y.

HIGH SPEED MIXER
For Heavy Duty

High speed "Discperser" disperses, deagglomerates, dissolves and emulsifies materials in a liquid base.

Model H units designed to handle from 20HP to 40HP drives. Completely self-contained oil hydraulic system for raising and lowering. Full 360° mixing swing for tank groupings. Rugged all steel construction.

Standard equipment includes stainless steel shaft, 8″ diameter and 12″ diameter stainless steel blades and three interchangeable V-belt pulleys which permit choice of 1200, 1800 and 2700 rpm mixing speeds. Units may be supplied with special or variable mixing speed and with physical dimensions to match special space limitations.

Herman Hockmeyer & Co., Dept. PVP, 341 Coster St., New York 59, N.Y.

POLYURETHANE RESIN
For Tough Finishes

A plastic and vegetable oil substance has been developed as a resin for paints and varnishes.

Use of the substance, called Polyurethane 101, is expected to bring marked improvement to floor coatings, paints and primers for buildings, boat hulls and auto bodies, low-bake industrial finishes and other industrial coating materials.

Product may be handled and stored like any other paint resin. When mixed with pigments or other paint and varnish ingredients, product facilitates rapid drying, extreme surface hardness, excellent resistance to boiling water, caustic, gasoline and certain acids, good flexibility, high impact resistance and resistance to marring.

Cargill, Inc., Dept. PVP, 200 Grain Exchange, Minneapolis 15, Minn.

PENTAERYTHRITOL
In Pellet Form

Technical grade pentaerythritol in pellet form has been made available primarily for use in alkyd resins.

In pellet form, PE is said to shorten cooking cycle, eliminate dust losses and make for easier handling.

Development quantities now available, with full commercial production scheduled before year's end.

Celanese Corp. of America, Dept. PVP, 180 Madison Ave., New York 16, N.Y.

MATERIALS and EQUIPMENT DIRECTORY

RESINS

Acrylics
American Cyanamid Co., Organic Chemicals Div.
Borden Co., Chemical Div.
E. I. duPont de Nemours and Co.
General Aniline & Film Corp.
Naugatuck Chemical Div., U. S. Rubber Co.
Rohm & Haas Co.

Alkyds
Alkydol Laboratories
American Cyanamid Co., Plastics & Resins Div.
Archer-Daniels-Midland Co.
Barrett Div. (Plaskon), Allied Chemical & Dye Corp.
California Ink Co., Inc.
Cambridge Industries Co.
Cargill, Inc.
Crosby Chemicals
Crownoil Chemical Co.
Farac Oil & Chemical Co.
Farnow, Inc.
Freeman Chemical Corp.
Hercules Powder Co.
Hilton-Davis Chemical Co.
Jones-Dabney Co.
Kraft Chemical Co.
McCloskey Varnish Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co.
Specialty Resin Co.
Fred'k A. Stressen-Reuter
Thibaut & Walker Co., Inc.
U. S. Coatings Corp.
T. F. Washburn Co.

Cellulosics
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Eastman Chemical Products, Inc.
Hercules Powder Co.

Chlorinated Rubber
Hercules Powder Co.

Coumarone-Indene
Barrett Div., Allied Chemical & Dye Corp.
Neville Chemical Co.
Pennsylvania Industrial Chemical Corp.

Cyclized Rubber
Alkydol Laboratories, Inc.
Goodyear Tire & Rubber Co., Inc.

Cyclopentadiene
R-B-H Dispersions, Div. of Interchemical Corp.

Epoxy
Alkydol Laboratories, Inc.
Bakelite Co.
Dow Chemical Co.
Ciba Co., Inc.
Freeman Chemical Corp.
Jones-Dabney Co.
Reichhold Chemicals, Inc.
Schenectady Varnish Co.
Shell Chemical Corp.
Sherwin-Williams Co.

Epoxy Esters
Farnow, Inc.
McCloskey Varnish Co.
T. F. Washburn Co.

Ester Gum Solutions
Alkydol Laboratories, Inc.
Crosby Chemicals, Inc.
Crownoil Chemical Co.
Glidden Co.
Hercules Powder Co.
C. J. Osborn Co.
Pine Chemicals, Inc.
Reichhold Chemicals, Inc.

Fumaric
Alkydol Laboratories, Inc.
Filtered Rosin Products, Inc.
C. J. Osborn Co.
Reichhold Chemicals, Inc.
Schenectady Resins

Hydrocarbons
Alkydol Laboratories, Inc.
Allied, Asphalt & Mineral Corp.
American Gilsonite Co.
Amoco Chemicals Corp.
Cosden Petroleum Corp.
Koppers Co., Tar Products Div.
Neville Chemical Co.
Pennsylvania Industrial Chemical Corp.
R-B-H Dispersions, Div. of Interchemical Corp.
Velsicol Chemical Corp.
G. S. Ziegler & Co.

Isocyanates
Carwin Co.
E. I. du Pont de Nemours Co.
Mobay Chemical Co.
National Aniline Div., Allied Chemical & Dye Corp.

Melamines
American Cyanamid Co., Plastics & Resins Div.
Barrett Div. (Plaskon), Allied Chemical & Dye Corp.
Monsanto Chemical Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.

Maleics
Alkydol Laboratories, Inc.
Barrett Div. (Plaskon), Allied Chemical & Dye Corp.
Crosby Chemicals, Inc.
Crownoil Chemical Co.
Hercules Powder Co.
Jones-Dabney Co.
Naugatuck Chemical Div., U. S. Rubber Co.
C. J. Osborne Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co.

Natural Resins
Acme Shellac Products Co.
Gillespie-Rogers-Pyatt Co., Inc.
Haeuser Shellac Co.
Hercules-Powder Co.
Heyden-Newport
O. G. Innes Corp.
Internatio-Rotterdam
Reichhold Chemicals, Inc.
Thibaut & Walker Co., Inc.
William Zinsser & Co.

Nitrocellulose Solutions
Cellofilm Industries, Inc.

Phenolics
Alkydol Laboratories, Inc.
American Cyanamid Co., Plastics & Resins Div.
Bakelite Co.
Barrett Div. (Plaskon), Allied Chemical & Dye Corp.
Crownoil Chemical Co.
Farnow, Inc.
General Electric Co., Chemical & Metallurgical Div.
Hercules Powder Co.
Krumbhaar Chemicals, Inc.
McCloskey Varnish Co.

For Addresses See Company Directory

Monsanto Chemical Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Varcum Chemical Corp.

Polyamides

General Mills, Inc.

Polybutenes

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Amoco Chemicals Corp.
Cosden Petroleum Corp.
Enjay Co.
Naftone, Inc.
Oronite Chemical Co.
Phillips Petroleum Co.

Polyesters

Alkydol Laboratories, Inc.
American Cyanamid Co., Plastics & Resins Div.
Archer-Daniels-Midland Co.
Atlas Powder Co.
Bakelite Co.
Barrett Div. (Plaskon), Allied Chemical & Dye Corp.
E. I. du Pont de Nemours & Co.
Freeman Chemical Corp.
Mobay Chemical Co.
Naugatuck Chemical Div., U. S. Rubber Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Specialty Resins Co.

Polystyrenes

Bakelite Co.
Dow Chemical Co.
Koppers Co.
Marbon Chemical, Div. of Borg-Warner
Monsanto Chemical Co.
Naugatuck Chemical Div., U. S. Rubber Co.
Pennsylvania Industrial Chemical Corp.
U. B. S. Chemical Corp.

Polyurethanes

Cargill, Inc.
Spencer-Kellogg and Sons, Inc.

Silicones

Dow Corning Corp.
General Electric, Chemical Materials Dept.
Linde Air Product Co., Div. Union Carbide Corp.

Styrene Copolymers

Bakelite Co.
Dewey & Almy Chemical Co.
General Tire & Rubber Co.
B. F. Goodrich Chemical Co.
Goodyear Tire & Rubber Co., Inc., Chemical Div.
Koppers Co.
Monsanto Chemical Co.
Naugatuck Chemical Div., U. S. Rubber Co.

Synthetic Rubber (Hypalon)

E. I. du Pont de Nemours & Co., Elastomers Div.

Terpenes

Crosby Chemical Co.
Hercules Powder Co.
Glidden Co.
Newport Industries, Div. Heyden-Newport Chemical Corp.
Pennsylvania Industrial Chemical Corp.
Schenectady Varnish Co.

Thixotropic Vehicles

T. F. Washburn Co.

Ureas

American Cyanamid Co., Plastics & Resins Dept.
Barrett Div. (Plaskon), Allied Chemical & Dye Corp.
Jones-Dabney Co.
Monsanto Chemical Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Sherwin-Williams

Vinyls

Bakelite Co.
Borden Co., Chemical Div.
Colton Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Firestone Plastics Co., Div. of Firestone Tire & Rubber Co.
General Aniline & Film Corp.
B. F. Goodrich Chemical Co.
Goodyear Tire & Rubber Co., Inc.
Monsanto Chemical Co.
National Starch Products, Inc.
Naugatuck Chemical Div., U. S. Rubber Co.
Reichhold Chemicals, Inc.
Shawinigan Resins Corp.

Vinyl Acetate Solutions

Cellofilm Industries, Inc.

LATEX EMULSIONS

Acrylic

Rohm & Haas Co.
Jersey State Chemical Co.
Union Bay State Chemical Co.

Interpolymer Type

Monsanto Chemical Co.

Latex Base

Naftone, Inc.

Polystyrene Emulsions

Bakelite Co.
Dow Chemical Co.
Koppers Co., Inc., Chemical Div.
Monsanto Chemical Co.
Union Bay State Chemical Co.

Polyvinyl Acetate Emulsions

Bakelite Co.
Borden Co.
Calvert-Mount Winans
Celanese Corp. of America (Plastics)
Colton Chemical Co.
Crownoil Chemical Co.
Dewey & Almy Chemical Co.
E. I. du Pont de Nemours & Co., (Electrochemical Dept.)
Jones-Dabney Co.
Morningstar-Paisley, Inc.
National Starch Products, Inc.
Nopco Chemical Co.
Shawinigan Resins Corp.
Reichhold Chemicals, Inc.
U. S. Rubber Co., Naugatuck Chemical Div.
R. T. Vanderbilt Co.

Styrene-Butadiene

Borden Co.
Dewey & Almy Chemical Co.
Dow Chemical Co.
Firestone Plastics Co.
General Tire & Rubber Co., Chemical Div.
Goodyear Tire & Rubber Co., Inc. Chemical Div.
Koppers Co., Inc., Chemical Div.
Union Bay State Chemical Co.
U. S. Rubber Co., Naugatuck Chemical Div.

Synthetic Types

California Ink Co., Inc.
Pioneer Latex & Chemical Co.

Vinylidene Chloride

Dow Chemical Co.

Miscellaneous Types

Alkydol Laboratories, Inc.
Archer-Daniels-Midland
Cargill, Inc.
Pennsylvania Industrial Chemicals

PIGMENTS

Whites

American Cyanamid Co., Pigment Div.
American Zinc Sales Co.
Godfrey L. Cabot, Inc.
Chemical & Pigment Co.
E. I. du Pont de Nemours & Co.
Eagle-Picher Co.
Glidden Co.
New Jersey Zinc Co.
St. Joseph Lead Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Titanium Pigment Corp.

Blacks

Acheson Colloids Co.
Godfrey L. Cabot, Inc.
Columbian Carbon Co.
General Carbon Co.
Harshaw Chemical Co.
J. M. Huber Corp.
H. Kohnstamm
Mineral Pigments Corp.
Reichard-Coulston, Inc.
Sid Richardson Carbon Co.
Shepherd Chemical Co.
Smith Chemical & Color Co.
J. Lee Smith & Co.
R. T. Vanderbilt Co.
C. K. Williams & Co.
Witco Chemical Co.

Inorganic Types

Blues

Eagle-Picher Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
Standard Ultramarine & Color Co.

Whittaker, Clark & Daniels, Inc.

Browns & Tans

Columbian Carbon Co.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
Smith Chemical & Color Co.
J. Lee Smith & Co.
C. K. Williams & Co.

Greens

Glidden Co.
Imperial Paper & Color Corp.
Mineral Pigment Corp.
C. K. Williams & Co.
Kentucky Color & Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Smith Chemical & Color Co.
Standard Ultramarine & Color Co.

Oranges

Climax Molybdenum Co.
E. I. du Pont de Nemours & Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
Mineral Pigments Corp.
Sherwin-Williams Co., Pigment, Color & Chemical Div.

Red & Maroons

Columbian Carbon Co.
Eagle-Picher Co.
Glidden Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
Mineral Pigment Corp.
Reichard-Coulston, Inc.
Smith Chemical & Color Co.
J. Lee Smith & Co.
C. K. Williams & Co.

Yellows

Columbian Carbon Co.
E. I. du Pont de Nemours & Co.
Glidden Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Smith Chemical & Color Co.
J. Lee Smith & Co.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Organic Types

Blues

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co.
Federal Color Laboratories, Inc.
General Dyestuff Corp.
B. F. Goodrich Chemical Co., Harmon Colors
Harshaw Chemical Co.
Imperial Paper & Color Corp.
H. Kohnstamm & Co., Inc.
Kentucky Color & Chemical Co.
Mineral Pigments Corp.
Pittsburgh Coke & Chemical Co.
Sandoz
Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.

Browns & Tans

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
General Dyestuff Corp.
B. F. Goodrich Chem. Co., Harmon Colors
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz
Sherwin-Williams Co.

Greens

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co.
Federal Color Laboratories, Inc.
General Dyestuff Corp.
B. F. Goodrich Chemical Co., Harmon Colors
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Pittsburgh Coke & Chemical Co.
Sandoz
Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.

Oranges

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
General Dyestuff Corp.
B. F. Goodrich Chemical Co., Harmon Colors
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
Mineral Pigments Corp.
Sandoz
Standard Ultramarine & Color Co.

Reds & Maroons

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co.
Federal Color Laboratories, Inc.
General Dyestuff Corp.
B. F. Goodrich Chemical Co., Harmon Colors
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Sandoz
Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.

Yellows

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co.
Federal Color Laboratories, Inc.
General Dyestuff Corp.
B. F. Goodrich Chemical Co., Harmon Colors
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Sandoz
Shepherd Chemical Co.
Standard Ultramarine & Color Co.

Lakes & Toners

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
Collway Colors, Inc.
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.
B. F. Goodrich Chemical Co., Harmon Colors
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Magruder Color Co., Inc.
Pittsburgh Coke & Chemical Co.
Sandoz
Sherwin-Williams Co,. Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.

Dispersions

Acheson-Colloids Co.
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
California Ink Co., Inc.
Carbon Dispersions, Inc.
Claremont Dispersion
Columbian Carbon Co.
B. F. Goodrich Chemical Co., Harmon Colors
Goodyear Tire & Rubber Co., Inc., Chemical Div.
Harshaw Chemical Co.
Harwick Standard Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Kromall Chemical & Dispersions Corp.
Pennsylvania Color & Chemical Co.
R-B-H Dispersions, Div. of Interchemical Corp.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
J. Lee Smith & Co.
Thibaut & Walker Co., Inc.
Whittaker, Clark & Daniels, Inc.

Metallic

Aluminum Pastes & Powders

Aluminum Co. of America
Magna Mfg. Co.
Metals Disintegrating Co.
Reynolds Metals
Silberline Manufacturing Co., Inc.

Bronze Powders

Aluminum Co. of America
Magna Mfg. Co.
Metals Disintegrating

Brown

Smith Chemical & Color Co.

Green Gold Type

E. I. du Pont de Nemours & Co.

Zinc Dust

New Jersey Zinc Co.

Extenders & Fillers

Godfrey L. Cabot, Inc.
Carbola Chemical Co., Inc.
Chemical & Pigment Co.
Concord Mica Corp.
De Lore Div., National Lead Co.
Georgia Kaolin Co.
Georgia Marble Co.
Great Lakes Carbon Corp.
Hayden Mica Co.
J. M. Huber Corp.
International Talc Co., Inc.
Johns-Manville
Marine Magnesium Div., Merck & Co.
Minerals & Chemicals Corp. of America
Sherwin-Williams Co.
Smith Chemical & Color Co.
Tamms Industries, Inc.
Tennessee Products & Chemical Corp.
R. T. Vanderbilt Co.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Fluorescent

America Phosphors Corp.
Canadian Radium & Uranium Corp.
General Dyestuff Corp.
Imperial Paper & Color Co.
Shannon Luminous Materials Co.
New Jersey Zinc Sales Co.

Flush Colors

American Cyanamid Pigment Div.
Ansbacher-Siegle Corp.
Federal Color Laboratories, Inc.
General Dyestuff Corp.
Harwick Standard Chemical Co.
Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Sherwin-Williams Co.
Standard Ultramarine & Color Co.
Whittaker, Clark & Daniels, Inc.

Umbers and Siennas

Mineral Pigments Corp.
Smith Chemical & Color Co.
J. Lee Smith & Co.
Reichard-Coulston Inc.
C. K. Williams & Co.

Pearl Essence

Mearl Corp.
Rona Laboratories, Inc.

DRYING OILS

Castor Oils

Baker Castor Oil Co.
Brazilian Industrial Oils, Inc.
T. F. McAdam
Pacific Vegetable Oil Corp.
Sherwin-Williams Co.
Spencer Kellogg & Sons, Inc.
Woburn Chemical Corp.

Coconuts

Cargill, Inc.
E. F. Drew & Co.
Emery Industries, Inc.
Glidden Co.
Kraft Chemical Co.
Pacific Vegetable Oil Corp.
Spencer Kellogg & Sons, Inc.

Cotton Seed

Armour Chemical Div.
E. F. Drew & Co.
Emery Industries, Inc.
Spencer-Kellogg & Sons

Dicyclopentadiene Copolymers

Spencer Kellogg & Sons, Inc.

Fish Oils

Archer-Daniels-Midland Co.
Cargill, Inc.
Crownoil Chemical Co.
T. F. McAdam
Werner G. Smith, Inc.

Linseed Oils

Archer-Daniels-Midland Co.
Cargill, Inc.
T. F. McAdam
Spencer Kellogg & Sons, Inc.
Minnesota Linseed
Pacific Vegetable Oil Corp.
Sherwin-Williams Co.
G. S. Ziegler & Co.

Oiticica

Brazil Oiticica, Inc.
Brazilian Industrial Oils, Inc.
T. F. McAdam
Pacific Vegetable Oil Corp.

Petroleum Drying Oils

Amoco Chemicals Corp.
Enjay Co.
Sun Oil Co.
Safflower
Pacific Vegetable Oil Corp.

Soybean Oils

Archer-Daniels-Midland Co.
Cargill, Inc.
Crownoil Chemical Co.
E. F. Drew
Emery Industries, Inc.
Glidden Co.
General Mills
T. F. McAdam
Spencer Kellogg & Sons, Inc.
Pacific Vegetable Oil Corp.
A. E. Staley Mfg. Co.
G. S. Ziegler & Co.

Styrenated Oils

Spencer Kellogg & Sons, Inc.

Tall Oils

Alkydol Laboratories, Inc.
Arizona Chemical Co.
Crosby Chemicals, Inc.
Farac Oil & Chemical Co.
T. F. McAdam
Glidden Co.
Hercules Powder Co.
Heyden-Newport
Kraft Chemical Co.
Werner G. Smith, Inc.
Union Bag & Paper Corp.
West Virginia Pulp & Paper Co.
G. S. Ziegler & Co.

Tung Oils

Internatio-Rotterdam
T. F. McAdam
Werner G. Smith, Inc.

FATTY ACIDS, ESTERS AND DERIVATIVES

Antara Chemical Div.
Archer-Daniels-Midland Co.
Armour Chemical Div.
Atlas Powder Co.
Baker Castor Oil Co.
Crosby Chemical Co.
E. F. Drew & Co.
Emery Industries
General Mills, Chemical Div.
Glyco Products Co.
A. Gross & Co.
Harchem Div., Wallace & Tiernan, Inc.
Heyden-Newport
T. F. McAdam
Nopco Chemical Co.
Solvents and Chemicals Group
Swift & Co.
Woburn Chemical Corp.
G. S. Ziegler Co.

INTERMEDIATES

Anhydrides & Acids

Adipic Acid

E. I. du Pont de Nemours & Co.
Monsanto Chemical Co.
National Aniline Div., Allied Chemical & Dye Corp.

Benzoic Acids

Heyden-Newport
Mallinckrodt Chemical Works
Merck & Co.
Monsanto Chemical Co.

Dicyclopentadiene

Borden Co., Chemical Div.
Enjay Co.
Union Carbide Chemicals Co.

Di & Polybasic Acids

Emery Industries, Inc.
Heyden-Newport
National Aniline Div., Allied Chemical & Dye Corp.
U. S. Industrial Chemicals Co.

Dodencenylsuccinic Anhydrides

National Aniline Div., Allied Chemical & Dye Corp.

Fumaric Acids

Chas. Pfizer & Co., Inc.
Pittsburgh Coke & Chemical Co.
Monsanto Chemical Co.

National Aniline Div., Allied Chemical & Dye Corp.

Hexahydrophthalic Anhydrides

National Aniline Div., Allied Chemical & Dye Corp.

Isophthalic Anhydrides

Oronite Chemical Co.

Maleic Anhydrides

American Cyanamid Co., Industrial Chemical Div.
Barrett Div., Allied Chemical & Dye Corp.
Union Carbide Chemicals Co.
Monsanto Chemical Co.
National Aniline Div., Allied Chemical & Dye Corp.
Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.

Naphthenic Acid

Enjay Co.
Gulf Oil
Oronite Chemical Co.
Sun Oil Co.

Phthalic Anhydrides

American Cyanamid Co., Industrial Chemical Div.
Barrett Div., Allied Chemical & Dye Corp.
Koppers Co., Inc., Tar Products Div.
Mallinckrodt Chemical Works
Monsanto Chemical Co.
National Aniline Div., Allied Chemical & Dye Corp.
Oronite Chemical Co.
Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.

Succinic Acids

National Aniline Div., Allied Chemical & Dye Corp.

Tetrahydrophthalic Anhydrides

National Aniline Div., Allied Chemical & Dye Corp.

Polyols

Butanediol

Celanese Corp. of America
Union Carbide Chemicals Co.

Butenediol

General Aniline & Film Corp.

Glycerine

Dow Chemical Co.
E. F. Drew
Glycerine Corp. of America
A. Gross & Co.
Lever Bros.
Mallinckrodt Chemical Works
Procter & Gamble
Shell Chemical Corp.
Solvents & Chemical Group
Swift & Co.

Pentaerythritols (Di & Tri)

Celanese Corp. of America
Commercial Solvents Co.
Delaware Chemicals
Gulf Oil Corp., Petrochemicals Dept.
Hercules Powder Co.
Heyden-Newport
Charles A. Koons
Reichhold Chemicals, Inc.
Trojan Powder Co.

Polyhydroxy Resin

Dow Chemical Co.
Shell Chemical Co.

Sorbitol

Atlas Powder Co.
Merck & Co.

Trimethyloethane

Celanese Corp. of America
Heyden-Newport
Trojan Powder Co.

Trimethylopropane

Celanese Corp. of America
Heyden-Newport
Trojan Powder Co.

Miscellaneous

Alpha Methylstyrene

Dow Chemical Co.

Bisphenol A

Dow Chemical Co.

Divinylbenzene

Dow Chemical Co.
Koppers Co.

Epichlorohydrin

Dow Chemical Co.
Shell Chemical Corp.
Union Carbide Chemicals Co.

Formaldehyde

American Cyanamid Co., Industrial Chemical Div.
Borden Co., Chemical Div.
Celanese Corp. of America
Commercial Solvents Corp.
Heyden-Newport
Mallinckrodt Chemical Works
Monsanto Chemical Co.
Nitrogen Div., Allied Chemical & Dye Corp.
Olin Mathieson Chemical Corp.
Reichhold Chemicals, Inc.

Hexmethylenetetramine

Borden Chemical Co., Chemical Div.
E. I. du Pont de Nemours & Co.
Heyden-Newport
Mallinckrodt Chemical Works
Olin Mathieson Chemical Corp.

Methyl Esters

General Mills, Inc.

Glycols (Ethylene, etc.)

Barrett Div., Allied Chemical & Dye Corp.
Union Carbide Chemicals Co.
Celanese Corp. of America
Dow Chemical Co.
Merck & Co.
Shell Chemical Corp.
Solvents & Chemical Group

Methyl Glucoside

Corn Products Refining Co.

Phenols

American Cyanamid Co., Organic Chemical Div.
Barrett Div.
Koppers Co.
Mallinckrodt Chemical Works
Monsanto Chemical Co.
Oronite Chemical Co.
Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.

Resorcinol

Heyden-Newport
Koppers Co.
Mallinckrodt Chemical Works
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Union Carbide Chemicals Co.

Styrene Monomer

Cosden Petroleum Corp.
Dow Chemical Co.
Koppers Co.
Monsanto Chemical Co.
Union Carbide Chemicals Co.

Tar Bases & Acids

Barrett Div., Allied Chemical & Dye Corp.
Koppers Co.
Pittsburgh Coke & Chemical Co.

Ureas

American Cyanamid Co.
E. I. du Pont de Nemours & Co.
Grace Chemical Co., Div. of W. R. Grace & Co.
Mallinckrodt Chemical Works
Monsanto Chemical Co.

Vinyltoluene

Dow Chemical Co.

Rosin & Terpene Chemicals

Godfrey L. Cabot
Crosby Chemical Co.
Dixie Pine Products
Glidden Co.
Hercules Powder Co.
Heyden-Newport
National Rosin Oil Products
Reichhold Chemicals, Inc.
Solvents and Chemicals Group
Southern Naval Stores
West Virginia Pulp & Paper Co.
G. S. Ziegler & Co.
Zophar Mills

SOLVENTS

Aliphatics

American Mineral Spirits Co.
R. J. Brown Co.
Continental Oil Co.
Eastern States Chemical Corp.
Esso Standard Oil Co.
Fallek Products Co.
Penola Oil Co.
Phillips Petroleum Co.
Shell Oil Co.
Skelly Oil Co.
Socony Mobil Oil Co., Inc.
Solvents and Chemicals Group
Standard Oil Co. of Ohio

Aromatics

American Mineral Spirits Co.
Anderson-Prichard Oil Corp.

Atlantic Refining Co.
Barrett Div., Allied Chemical & Dye Corp.
R. J. Brown Co.
Cosden Petroleum Corp.
Dow Chemical Co.
Eastern States Chemical Corp.
Esso Standard Oil Co.
Fallek Products Co.
Neville Chemical Co.
Pennsylvania Industrial Chemical Corp.
Pittsburgh Coke & Chemical Co.
Phillips Petroleum Co.
Penola Oil Co.
Shell Oil Co.
Sinclair Chemicals, Inc.
Solvents and Chemicals Group
Sun Oil Co.
United States Steel Corp.
Velsicol Chemical Corp.

Halogen-Containing

Columbia-Southern Chemical Corp.
Diamond Alkali Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Kolker Chemical Corp.
Olin Mathieson Chemical Corp.
Solvents and Chemicals Group
Wyandotte Chemical Corp.

Naphthas

American Mineral Spirits Co.
Eastern States Chemical Corp.
Esso Standard Oil Co.
Neville Chemical Co.
Pennsylvania Industrial Chemical Corp.
Penola Oil Co.
Phillips Petroleum Co.
Pittsburgh Coke & Chemical Co.
Shell Oil Co.
Sinclair Chemicals, Inc.
Skelly Oil Co.
Socony Mobil Oil Co., Inc.
Solvents & Chemicals Group
Standard Oil Co. of Ohio

Nitroparaffins

Commercial Solvents Corp.

Odorless

American Mineral Spirits Co.
Anderson-Prichard Oil Corp.
R. J. Brown Co.
Phillips Petroleum Co.
Shell Oil Co.
Sinclair Chemicals, Inc.
Socony Mobil Oil Co., Inc.
Standard Oil Co. of Ohio

Oxygen-Containing

Barrett Div., Allied Chemical & Dye Corp.
Celanese Corp. of America, Chemical Div.
Commercial Solvents Corp.
Eastman Chemical Products, Inc.
E. I. du Pont de Nemours & Co.
Hercules Powder Co.
National Aniline Div., Allied Chemical & Dye Corp.
Pennsylvania Salt Manufacturing Co., Industrial Div.
Publicker Industries, Inc.
Solvents & Chemicals Group
Shell Chemical Corp.
George Senn, Inc.
U. S. Industrial Chemicals Co.
Union Carbide Chemical Co.

Turpentines

Godfrey L. Cabot
Crosby Chemicals, Inc.
Glidden Co.
Guignon & Green, Inc.
Hercules Powder Co.
Heyden-Newport
Pine Chemicals, Inc.
Sherwin-Williams Co.
Solvents and Chemicals Group
Southern States Chemical Co.

PLASTICIZERS

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Alkydol Laboratories, Inc.
Archer-Daniels-Midland Co.
Armour Chemical Div.
Atlas Powder Co.
Baker Castor Oil Co.
Barrett Div., Allied Chemical & Dye Corp.
Godfrey L. Cabot, Inc.
Cambridge Industries Co., Inc.
Celanese Corp. of America, Chemical Div.
Commercial Solvents Corp.
Diamond Alkali Co.
E. F. Drew & Co.
Eastman Chemical Products, Inc.
Emery Industries, Inc.
B. F. Goodrich Chemical Co.
Harchem Div., Wallace & Tierman Co.
Harwich Standard Chemical
Hercules Powder Co.
Kolker Chemical Corp.
Monsanto Chemical Co.
Naftone, Inc.
Neville Chemical Co.
Ohio-Apex Div., Food Machinery & Chemical Corp.
Pennsylvania Industrial Chemical Co.
Chas. Pfizer & Co., Inc.
Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
The Solvents and Chemicals Group
Tennessee Products & Chemical Corp.
Union Carbide Chemical Co.
Witco Chemical Co.
G. S. Ziegler & Co.

ADDITIVES

Anti-Foaming Agents

American Cyanamid Co., Organic Chemical Div.
Antara Chemicals
Dow Corning Corp.
E. I. du Pont de Nemours & Co.
Foremost Food and Chemical Co.
General Electric Co., Silicone Products Dept.
Glyco Products Co., Inc.
Nopco Chemical Co.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Union Carbide Chemical Co.

Anti-Floating Agents

Dow Corning Corp.
General Electric Co., Silicone Products Dept.
Imperial Paper & Color Corp.
Troy Chemical Co.

Anti-Livering Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Pennsylvania Salt Mfg. Co., Industrial Div.

Anti-Flooding Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Lecithin Co.
Baker Castor Oil Co.
Dow Corning Corp.
Linde Air Products Co., Div. of Union Carbide Corp.
Minerals & Chemicals Corp. of America
Nopco Chemical Co.
Raybo Chemical Co.
Synthetic Chemicals, Inc.

Anti-Sagging Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Baker Castor Oil Co.
Raybo Chemical Co.
Troy Chemical Co.

Anti-Settling Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Godfrey L. Cabot, Inc.
Baker Castor Oil Co.
W. H. Fales Co.
Fallek Products Co.
Foremost Food and Chemical Co.
Naftone, Inc.
Raybo Chemical Co.
Troy Chemical Co.

Anti-Skinning Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Naftone, Inc.
National Aniline Div., Allied Chemical & Dye Corp.
Neville Chemical Co.
Nuodex Products Co.
Pennsylvania Salt Mfg. Co., Industrial Div.
Raybo Chemical Co.
Sindar Corp.
Synthetic Chemicals, Inc.
Troy Chemical Co.

Bactericides

Buckman Laboratories, Inc.
Metalsalts Corp.

Bodying Agents

Advance Solvents & Chemical, Div. of Carlisle Chemical Works, Inc.
Baker Castor Oil Co.
Nuodex Products Co.
Raybo Chemical Co.
Ross & Rowe, Inc.
Troy Chemical Co.

Carboxymethylcellulose
Dow Chemical Co.
Hercules Powder Co.

Casein
Borden Co.
W. H. Fales Co.

Chlorinated Paraffin
Bakelite Co.
Diamond Alkali Co.

Corrosion Inhibitor
Tennessee Products & Chemical Corp.
Raybo Chemical Co.

Curing Agents
Anderson Chemical Co.
National Aniline Div., Allied Chemical & Dye Corp.

Deodorants
Aromatic Products
Polak & Schwartz
Rhodia, Inc.
Sindar Corp.
van Ameringen-Haebler, Inc.

Dispersing Agents
Air Reduction Chemical Co.
American Cyanamid Co.
American Lecithin Co.
Antara Chemical Div.
Armour Chemical Div.
Atlantic Refinery Co.
Atlas Powder Co.
Godfrey L. Cabot
Commercial Solvents Corp.
Geigy Industrial Chemical Div.
Glyco Products Co.
Johns-Manville
Minerals & Chemicals Corp. of America
National Aniline Div., Allied Chemical & Dye Corp.
Nopco Chemical Co.
Nuodex Products Co.
Raybo Chemical
Troy Chemical Co.
Union Carbide Chemical Co.
R. T. Vanderbilt Co.
Wyandotte Chemicals Corp.

Driers
Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
California Ink Co., Inc.
Ferro Chemical Corp.
Harshaw Chemical Co.
McCloskey Varnish Co.
Naftone, Inc.
Nuodex Products Co.
Oronite Chemical Co.
Shepherd Chemical Co.
Fred'k A. Stresen-Reuter
Witco Chemical Co.

Drying Accelerators
R. T. Vanderbilt Co.

Dyes For Stains
National Aniline Div., Allied Chemical & Dye Corp.

Emulsifiers
Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Air Reduction Chemical Co.
American Cyanamid Co., Organic Chemical Div.
American Lecithin Co.
Antara Chemical Div.
Atlantic Refining Co.
Atlas Powder Co.
Fallek Products Co.
Foremost Food and Chemical Co.
Geigy Industrial Chemical Div.
Glyco Products Co.
Minerals & Chemicals Corp. of America
Mona Industries
National Aniline Div., Allied Chemical & Dye Corp.
Nopco Chemical Co.
Olin Mathieson Chemical Corp.
Pennsylvania Salt Mfg. Co., Industrial Div.
Raybo Chemical Co.
Ross & Rowe
A. E. Staley Mfg. Co.
Stepan Chemical Co.
Synthetic Chemicals Co.
Union Carbide Chemical Co.
Witco Chemical Corp.
Wyandotte Chemicals Corp.

Flatting Agents
Godfrey L. Cabot
Davison Chemical Co., Div. of W. R. Grace & Co.
Dow Corning Corp.
Dicalite Div.
Great Lakes Carbon Corp.
Glyco Products Co.
J. M. Huber Corp.
Johns-Manville
Minerals & Chemicals Corp. of America
Nopco Chemical Co.
Whittaker, Clark & Daniels

Flow Controlling Agents
Dow Corning Corp.
Jones-Dabney Co.
Raybo Chemical Co.
R. T. Vanderbilt Co.

Fungicides
Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Antara Chemical Div.
Buckman Laboratories, Inc.
Denton Edwards, Ltd.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Ferro Chemical Corp.
Gallowhur Chemical Corp.
Heyden-Newport
Key Chemicals, Inc.
Metalsalts Corp.
Naftone, Inc.
Nuodex Products Co.
Scientific Oil Compounding Co.
Troy Chemical Co.
R. T. Vanderbilt Co.
Witco Chemical Corp.

Gloss Improver
Dow Corning Corp.
Raybo Chemical Co.

Grinding Aids
Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
General Aniline & Film Corp.
Nuodex Products Co.
Raybo Chemical Co.
Ross & Rowe
Synthetic Chemicals, Inc.
Troy Chemical Co.

Inhibitors
Nuodex Products Co.

Latex Additives
Naftone, Inc.

Lecithin
American Lecithin Co., Inc.
Naftone, Inc.
A. E. Staley Mfg. Co.
Ross & Rowe, Inc.

Marproofing Agents
Raybo Chemical Co.

Masking Agents
Aromatic Products Co.
Pollak & Schwartz
Sindar Corp.
van Ameringen-Haebler, Inc.

Masonry Water Repellents
Dow Corning Corp.
General Electric Co.

Metal Cleaners
Pennsylvania Salt Mfg. Co., Industrial Div.

Mildewcides
Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Antara Chemicals
Buckman Laboratories, Inc.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Gallowhur

Odorants
Aromatic Products Co.
Pollak & Schwartz
Rhodia, Inc.
Sindar Corp.
van Ameringen-Haebler, Inc.

Paint Remover Ingredients
Dow Chemical Co.
Pennsylvania Salt Mfg. Co., Industrial Div.

Phosphate Coatings
Pennsylvania Salt Mfg. Co., Industrial Div.

Preservatives
Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Buckman Laboratories, Inc.
California Ink Co., Inc.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Nuodex Products Co.
Shepherd Chemical Co.
Union Carbide Chemical Co.

Protective Colloids
Borden Co.
Kelco Co.
Shawinigan Resins Corp.

Puffing Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Raybo Chemical Co.

Reflective Spheres

Flex-O-Lite Mfg. Co.
Potters Brothers, Inc.

Sanitizing Agent

Nuodex Products Co.

Shingle Stain Oil

Neville Chemical Co.

Stabilizers

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Alkydol Laboratories, Inc.
Borden Co.
Dow Chemical Co.
Fallek Products Co.
General Aniline & Film Corp.
Metal & Thermit Corp.
Minerals & Chemicals Corp. of America
Nopco Chemical Co.
Pennsylvania Salt Mfg. Co., Industrial Div.
Raybo Chemical Co.

Stearates

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
W. H. Fales Co.
Mallinckrodt Chemical Works
Nuodex Products Co.
M. W. Parsons-Plymouth, Inc.
Smith Chemical & Color Co.
Whittaker, Clark & Daniels, Inc.
Witco Chemical Corp.

Surface Active Agents

Air Reduction Chemical Co.
American Alcolac Corp.
American Cyanamid Co., Organic Chemical Div.
Antara Chemical Div.
Armour Chemical Div.
Atlantic Refining Co.
Atlas Powder Co.
E. F. Drew
E. I. du Pont de Nemours & Co.
Foremost Food and Chemical Co.
Geigy Industrial Chemicals
General Mills, Chemical Div.
Glyco Products
Monsanto Chemical Co.
National Aniline Div., Allied Chemical & Dye Corp.
Nopco Chemical Co.
Pennsylvania Salt Mfg. Co., Industrial Div.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
Witco Chemical Co.
Wyandotte Chemical Corp.

Surface Preparation Chemicals

American Chemical Paint

Suspension Agents

Fallek Products Co.
B. F. Goodrich Chemical Co.
Kelco Co.
Minerals & Chemicals Corp. of America
Raybo Chemical Co.

Thickeners & Gelling Agents

Anderson Chemical Co.
Borden Co.
Godfrey L. Cabot, Inc.
W. H. Fales Co.
Dow Chemical Co.
General Aniline & Film Corp.
B. F. Goodrich Chemical Co.
Kelco Co.
Minerals & Chemicals Corp. of America
Nopco Chemical Co.
Price Varnish Co.
Raybo Chemical Co.
Shawinigan Resins Corp.
Shepherd Chemical Co.
Tamms Industries, Inc.
Union Carbide Chemical Co.
Witco Chemical Corp.
Wyandotte Chemicals Corp.

Vinyl Stabilizers

Harshaw Chemical Co.

Waxes

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Bakelite Co.
Glyco Products Co.
Semet-Solvay, Petrochemical Div.
Shell Oil Co.
Union Carbide Chemical Co.
Warwick Wax Co.
Witco Chemical Co.

PRODUCTION EQUIPMENT

Aerosol Charging Unit

Karl Kiefer Machine Co.

Azeotropic Systems

Brighton Copper Works
Blaw-Knox Co., Buflovak Equipment Div.

Ball & Pebble Mills

Abbé Engineering Co.
Paul O. Abbé, Inc.
Baker Perkins
Epworth Mfg. Co.
Patterson Foundry & Machine Co.
Stevenson Co.
U. S. Stoneware Co.

Barrell Rollers

Abbé Engineering Co.
Paul O. Abbé, Inc.
U. S. Stoneware Co.

Blenders

Abbé Engineering Co.
Paul O. Abbé, Inc.
Patterson-Kelley Co.
Read-Standard Corp.
Charles Ross & Son Co.

Cleaning Machines

Karl Kiefer Machine Co.

Colloid Mills

Abbé Engineering Co.
Gifford-Wood Co.
Kinetic Dispersion Corp.
Manton-Gaulin Mfg. Co.
Morehouse-Cowles, Inc.
Tri-Homo Corp.
Troy Engine & Machine Co.

Carbon Dioxide

Liquid Carbonic Corp.

Dissolvers

Abbé Engineering Co.
Baker-Perkins
Hy-R-Speed, Inc.
Morehouse-Cowles, Inc.
Patterson Foundry & Machine Co.
Charles Ross & Son Co.

Dowtherm Kettles

Brighton Copper Works
Blaw-Knox Co., Buflovak Equipment Div.

Drum Reconditioners

L. M. Gilbert Co.

Drum Mixers

Abbé Engineering Co.
U. S. Stoneware Co.

Drum Rollers

Abbé Engineering Co.
U. S. Stoneware Co.

Filling Machines

C. M. Ambrose Co.
Bowser, Inc.
Hope Machine Co.
Karl Kiefer Machine Co.

Filters

Cuno Engineering Corp.
Filpaco Industries
Hercules Filter Corp.
Sparkler Mfg. Co.

Filtering Aids

Great Lakes Carbon Corp., Dicalite Div.
Johns-Manville

Filter Press

Biach Industries, Inc.
Sparkler Mfg. Co.

Gaskets

U. S. Stoneware Co.

Grinding Media

Abbé Engineering Co.
Paul O. Abbé, Inc.
LZP Industrial Ceramics Co.
McDanel Refractory Porcelain Co.
Patterson Foundry & Machine Co.
Stevenson Co.
U. S. Stoneware Co.

Inert Gas Generators

C. M. Kemp Mfg. Co.

Jar Rolling Machines

Abbé Engineering Co.
Paul O. Abbé, Inc.
U. S. Stoneware Co.

Labelling Machines

Chisholm-Ryder Co. of Pennsylvania
King Sales & Engineering Co.

Laboratory Jar Rolling Mills

Abbé Engineering Co.
Paul O. Abbé Co.
U. S. Stoneware Co.

Lid Dropper & Compressor

Karl Kiefer Machine Co.

Liquid Depth Indicators

Petrometer Corp.

Mill Head Assemblies
McDanel Refractory Porcelain Co.

Mill Jars
Abbé Engineering Co.
Paul O. Abbé Co.
U. S. Stoneware Co.

Mill Linings
Abbé Engineering Co.
Paul O. Abbé, Inc.
LZP Industrial Ceramics Co.
McDanel Refractory Porcelain Co.
Patterson Foundry & Machine Co.
Stevenson Co.

Mixers & Agitators
Abbé Engineering Co.
Paul O. Abbé, Inc.
Baker Perkins, Inc.
Brighton Copper Works
Cincinnati Hildebrand Co.
J. H. Day Co.
Epworth Mfg. Co.
Herman Hockmeyer & Co.
Hy-R-Speed, Inc.
International Engineering Corp.
Kinetic Dispersion Corp.
J. M. Lehmann Co., Inc.
Mixing Equipment Co.
Patterson Foundry & Machine Co.
Read Standard Corp.
Charles Ross & Son Co.
Stevenson Co.
Troy Engine & Machine Co.

Positive Displacement Meter
Bowser, Inc.
Rockwell Mfg. Co.

Pumps
Blackmer Pump Co.
Foster Pump Works, Inc.

Resin & Varnish Kettles
Blaw-Know Co., Buflovak Equipment Div.
Brighton Copper Works
Patterson Foundry & Machine Co.

Rollers For Barrels
Abbé Engineering Co.
Paul O. Abbé, Inc.

Roller Mills
Chemical & Pharmaceutical Industry Co., Inc.
J. H. Day Co.
J. M. Lehmann Co., Inc.
Kent Machine Works, Inc.
Charles Ross & Son Co.
Troy Engine & Machine Co.

Sieving & Screening Machines
Abbé Engineering Co.
J. M. Lehmann Co., Inc.

Specific Gravity Indicator
Petrometer Corp.

Stone Mills
Hy-R-Speed, Inc.

Strainers
C. M. Ambrose Corp.
Cuno Engineering Corp.
J. M. Lehmann Co.

Thinning & Tinting Tank
Abbé Engineering Co.
Paul O. Abbé Co.
Cincinnati Hildebrand Co.
J. H. Day
Herman Hockmeyer
Kent Machine Works
J. M. Lehmann Co.
Charles Ross & Son Co.
Stevenson Co.

Tumblers
Abbé Engineering Co.
Paul O. Abbé, Inc.

Material Handling
Barksdale Company
Carrier Conveyor Corporation
Clark Equipment Company
Thomas A. Edison, Inc.
The Elwell-Parker Electric Company
Filpaco Industries
Fuller Company
Hyster Company
The Lunkenheimer Co.
Market Forge Company
The Mercury Mfg. Company
Mitchell Industrial Tire Co., Inc.
Morse Mfg. Co., Inc.
Neptune Meter Company
Nutting Truck & Caster Co., Inc.
The Rapids-Standard Co., Inc.
The Raymond Corporation
Read Standard Corporation
Revolvator Company
Southwest Mill Industrial Equipment Company
Star Welding & Mfg. Division
Stephens-Adamson Mfg. Company
Sterling, Fleischman Co.
Stewart-Warner Corporation
Towmotor Corporation
Whiting Corporation
Wilder Mfg. Co., Inc.

Used Equipment
Machinery & Equipment Co.

Testing Equipment
Atlas Electric Devices
Beckman Instruments
Burrell Corp.
Fisher Scientific Co.
Gardner Laboratories, Inc.
Harshaw Scientific Div.
Hellige, Inc.
Morest Co.
Norcross Corp.
Photovolt Corp.
Precision Scientific Co.

Containers, Pails and Cans
Aluminum Co. of America
American Can Co.
Bennett Industries, Inc.
Continental Can Co., Inc.
Crown Cork & Seal Co., Inc., Can Div.
The Davies Can Co.
Fein's Tin Can Co., Inc.
Geuder-Paeschke & Frey Co.
Inland Steel Container Co.
Jones & Laughlin Steel Corp.
National Can Corp.
National Steel Container Corp.
Pressed Steel Tank Co.
Rheem Mfg. Co.
Stern Can Co.
United States Steel Products Div.
Vulcan Container, Inc.
Vulcan Steel Container, Inc.

Color Cards
Colwell Press, Inc.
General Printing Corp.
Gorr Color Card, Inc.
Matherson-Selig
Strobridge Color Card
White Color Card

TRADE NAME DIRECTORY

A

AA—Refined castor Oil. **Baker Castor Oil Co.**
Abay—Mill & mixing machinery. **Paul O. Abbé Inc.**
Abbé—Mills & mixing machinery. **Paul O. Abbé Inc.**
Abbé—Mills & mixing machinery. **Abbé Engineering Company.**
Abitol—Technical hydroabietyl alcohol. **Hercules Powder Company**
AC—Polyethylene. **Semet-Solvay Petrochemical Division**
Accol Resin—Resin emulsion. **Amalgamated Chemical Corp.**
Accu-Por—Round nozzle top paint cans. **American Can Co.**
Acetate P.A.—Deodorant. **Givaudan-Delawanna, Inc.**
Acetex—Emulsion copolymer. **Naugatuck Chemical Div., U. S. Rubber Co.**
Acintene—Pinenes and turpentine. **Arizona Chemical Company**
Acintol—Tall oil. **Arizona Chemical Company**
Acme—Shellac varnish. **Acme Shellac Products Co.**
Aconew Extra—Refined tall oil fatty acids. **Newport Industries, Inc.**
Aconon—Refined tall oil. **Newport Industries, Inc.**
Acosix—Refined tall oil. **Newport Industries, Inc.**
Acrawax C—Synthetic wax. **Glyco Products Co., Inc.**
Acryloid—Acrylic ester resins. **Rohm & Haas Company**
Acrylon—Acrylic rubber. **The Borden Company**
Acrylonitrile — Monomers. **Union Carbide Chemicals Co.**
Acrysol—Acrylic resin. **Rohm & Haas Company**
Activ-8—Drier-stabilizer. **R. T. Vanderbilt Co.**
Acyralasein—Casein solution. **W. H. Fales Co.**
Adher-O-Flex—Esterified Shellac. **Acme Shellac Products Co.**
Adipol—Plasticizer. **Ohio-Apex Division**
Adlube—Plastic mold lubricant. **Advance Solvents & Chemicals Div. of Carlisle Chemical Works, Inc.**
ADM Adols—Fatty Alcohols. **Archer Daniels Midland Company**
ADM Ester Gum—Complete line of Ester Gums. **Archer Daniels Midland Company**
ADM Natural Resins—Congo, Damar, East India, Kauri Gum, Manila Gum. **Archer Daniels Midland Company**
ADM Processed Congo—Fused & Esterified Congo Gum. **Archer Daniels Midland Company**
ADM Unadols—Fatty Alcohols. **Archer Daniels Midland Company**
Adol—Fatty Alcohols. **Archer Daniels Midland Company**
A D P—Carbon Black dispersions. **Acheson Dispersed Pigments Co.**
Advacide—Fungicidal compound. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advagum—Synthetic rubber extender. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advamin—Fungicidal compound. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advamix—Wetting agent. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advan—Accelerators. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advance—Naphthenate paint dryers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advaresin—Drying oil extenders. **Advance Solvents & Chemical Div. of Carlisle Chemical. Works, Inc.**
Advasol—Driers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advastab—Vinyl resin stabilizers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advawax—Petroleum waxes. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advawet—Wetting agents. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Aero—Maleic and Phthalic Anhydrides; various grades of Aluminum. Zinc and Calcium Metallic Soaps. **American Cyanamid Company**
Aerosol—Surface Active Agents. **American Cyanamid Company**
Age-Best Dispersion—Anti-Oxidant. **Borden Co.**
Air-Matic—Small parts washer. **The Protectoseal Co.**
Alamac—Fatty amine esters. **General Mills, Inc.**
Alamask—Paint deodorant. **Rhodia, Inc.**
Alamine—Primary fatty amines. **General Mills, Inc.**
Alathon—Polyethylene resin. **E. I. du Pont de Nemours & Co.**
Albacar—Precipitated calcium carbonate. **C. K. Williams & Co.**
Albalith—Lithopone. **New Jersey Zinc Co.**
Albone—Hydrogen peroxide. **E. I. du Pont de Nemours & Co.**
Albron—Aluminum Powders and Pastes. **Aluminum Company of America**
Alcoa—Aluminum Powders and Pastes. **Aluminum Company of America**
Alcolec—Lecithin. **American Lecithin Co., Inc.**
Alcroyd—Long Oil Alkyd. **Crosby Chemicals, Inc.**
Algel—Gelling agent. **Raybo Chemical Co.**
Aliphat—Tall oil fatty acids. **General Mills, Inc.**
Alkaterges—Surface active agents. **Commercial Solvents Corporation**
Alkyum—Alkyd Resin. **Adco Chemical Co.**
Alodine—Protective coating chemicals for aluminum and aluminum alloys. **American Chemical Paint Company**
Alrosols—Surface Active agent. **Geigy Industrial Chemicals**
Alsibronz—Water ground mica. **Franklin Mineral Products Company**
Amberlac—Modified alkyds. **Rohm & Haas Co.**
Amberol—Varnish and lacquer resins. **Rohm & Haas Company**
Ambrose—Filling and sealing machines and strainers. **C. M. Ambrose Co.**
Amine O—Surface active agent. **Geigy Industrial Chemicals**
Amsco-Solv—A group of intermediate aromatic petroleum solvents in varying boiling ranges. **American Mineral Spirits Company**
Amyl Acetate—Synthetic solvent. **Industrial Div., Pennsalt**
Analyte—Color comparator. **Crown Engineering & Sales Company**
Anathix—Thixotropic alkyd. **General Electric Co. (West Coast)**
Angular—Mixer. **Troy Engine & Machine Co.**
Ansol—Solvents. **U. S. Industrial Chemicals Co.**
Antifoam A—Silicone defoamer. **Dow Corning Corp.**
Antioxidant B—Anti-skinning agent and antioxidant. **National Aniline Division**
Antioxidant D—Anti-skinning agent and antioxidant. **National Aniline Division**
AntiSag—Anti-sagging, anti-settling, wetting and dispersing agent. **Raybo Chemical Company**
AntiSilk—Anti-silking, anti-floating agent. **Raybo Chemical Company**
Antiskin—Anti-skinning agent. **Raybo Chemical Company**
Antistat—Anti-static agent. **Raybo Chemical Company**
AP—Aromatic Plasticizer. **Pennsylvania Industrial Chemical Co.**
Apco—Aliphatic hydrocarbon thinner. **Anderson-Prichard Oil Corporation**
Apcothinner—Aliphatic petroleum thinner. **Anderson-Prichard Oil Corporation**
Aquablak—Carbon and bone blacks. **Columbian Carbon Co.**
Aqualastic—Casein solution. **W. H. Fales Co.**
Aquasperse 30—Casein vehicle for emulsion paints. **American Resinous Chemicals Corp.**
AR—Polyester resins. **General Electric Co.**
Araldite—Epoxy resins. **Ciba Company Inc.**
A-Resin—Heat convertible unsaturated aliphatic pure hydrogen polymer. **Enjay Company, Inc.**
Aritemp—Epoxy Casting Resins. **Aries Laboratories, Inc.**
Aricite—Grinding balls. **Patterson Foundry & Machine Co.**
Armac—Acetic acid salts of fatty amines. **Armour Chemical Division**
Armeens—High molecular weight aliphatic amines, paint additive. **Armour Chemical Division**
Armids—Aliphatic amides. **Armour Chemical Div.**
Arochem—Modified Phenolic Resins, modified maleic resins, specialty resins. **Archer Daniels Midland Company**
Aroclor—Chlorinated biphenyl resins. **Monsanto Chemical Company**
Arofene—Pure Phenolic Resins. **Archer Daniels Midland Company**
Aroflat—Alkyds & Specialties for Flat Finishes. **Archer Daniels Midland Company**
Aroflo—Channel black. **J. M. Huber Corp.**
Aroostocrat — Potato Starch. **Morningstar-Paisley, Inc.**
Aroplaz—Alkyd and Allied Resins. **Archer Daniels Midland Company**
Aropol—Copolymer Modified Alkyds, Polyester Resins. **Archer Daniels Midland Company**
Arothex—Thixotropic alkyd. **Archer-Daniels-Midland Co.**
Arquads—Quaternary ammonium salts. **Armour Chemical Div.**
Arrow Ink Black—Channel Black. **J. M. Huber Corp.**
ASA—Antiskinning agent and antioxidant. **National Aniline Division**
Asbestol—Calcium carbonate extender pigments. **Carbola Chemical Company**
ASP—Extender pigments, aluminum silicate. **Minerals & Chemicals Corp. of America**
ASRA—Three-roller ointment mills. **Chemical and Pharmeceutical Industry Co., Inc.**
Atlac—Polyester Alkyd Resins. **Atlas Powder Company**
Atlas—Dry colors. **H. Kohnstamm & Co., Inc.**
Attaclay—Finely powdered fullers earth. **Minerals & Chemicals Corp. of America**
Attasol—Colloidal fullers earth. **Minerals & Chemicals Corp. of America**
Attasorb—Fullers earth. **Minerals & Chemicals Corp. of America**
Aulabrite—Water dilutable color emulsions. **Aula Chemicals, Inc.**
Auto-Klean—All metal edge type filter. **The Cuno Engineering Corp.**
AYAA, AYAC, AYAF, AYAZ—Vinyl acetate resins. **Bakelite Co.**
Azo—Zinc Oxide pigments; lead-free and leaded. **American Zinc Sales Company**

B

Bahama Blue — Phthalocyanine blue pulps. **Standard Ultramarine & Color Co.**
Bakelite—Vinyl, polyethylene, phenolic and epoxy resins, emulsions and solutions. **Bakelite Co.**
Barber Gilsonite—Hydrocarbon resins. **American Gilsonite Co.**
Barden—Kaolin. **J. M. Huber Corp.**
Baryta White—99% $BaSO_4$ white barytes. **DeLore Div., National Lead Co.**
BCU—Urea resins. **Bakelite Company**
Bear—Lampblack. **Monsanto Chemical Co.**
Beckacite—Modified Phenolic resins. **Reichhold Chemicals, Inc.**
Beckamine—Urea-formaldehyde resins. **Reichhold Chemicals, Inc.**
Beckopol—Modified phenolic resins. **Reichhold Chemicals, Inc.**
Beckolin—Synthetic drying oils. **Reichhold Chemicals, Inc.**
Beckosol—Pure and modified alkyd resins. **Reichhold Chemicals Inc.**
Beetle—Urea-Formaldehyde Resins. **American Cyanamid Company**
Benthal—Polyhydric alcohol. **Monsanto Chemical Company**
Bentone—Gelling Agents. **National Lead Co.**
Benzoflex—Chemical Plasticizers. **Tennessee Products & Chemical Corporation**

For Addresses See Company Directory

Benzo Sol—Light Naphtha. **Shell Oil Company**
Big-M-Gel—Long oil liquid gel. **Adco Chemical Company**
BKR—Lump phenolic resin. **Bakelite Co.**
BKS—Phenolic baking solutions. **The Bakelite Co.**
Black Pearls—Pelleted channel carbon blacks. **Godfrey L. Cabot, Inc.**
Black Shield—Pigment dispersions. **Carbon Dispersions, Inc.**
Blancol—Anionic dispersant. **Antara Chemicals**
B. M. G.—Long oil liquid gel. **Adco Chemical Company**
Boroterm—Highly soluble borate composition for fire resistant water-base paints. **American Potash & Chemical Corp.**
Boxeal—Case sealing glue. **Morningstar-Paisley Inc.**
BRC—Resinous hydrocarbon plasticizer. **Barrett Division**
BR Castor Oil—Bleached, refined, raw castor oil. **Pacific Vegetable Oil Corp.**
Bruji—Emulsifiers; polyoxyethylene lauryl ethers. **Atlas Powder Company**
Bronoco—Aliphatic and aromatic petroleum solvents. **The R. J. Brown Company**
BRS—Polyester resins. **Bakelite Company**
Buckeye Pro-Cote—Protein thickener-stabilizer. **The Buckeye Cotton Oil Company**
Buckeye Protein—Protein thickener-stabilizer. **The Buckeye Cotton Oil Company**
Bufen 30—Preservative. **Buckman Laboratories, Inc.**
Bufenoleate 30—Preservative. **Buckman Laboratories, Inc.**
Bulls Eye Brand—Shellac gums. **William Zinsser & Co., Inc.**
Burnok—Thixotropic paint vehicles. **Fred'k. A. Stresen-Reuter, Inc.**
Burnok—Thixotropic vehicles. **T. F. Washburn Company**
Burtonite—Guar Seed Gum. **The Burtonite Co.**
Burundum—Grinding media. **The U. S. Stoneware Company**
Butaprene—Paint latex. **The Firestone Plastics Company**
Butarez—Petroleum hydrocarbon resin. **Phillips Petroleum Company**
Butrol—Preservative. **Buckman Laboratories, Inc.**
Butvar—Polyvinyl butyral resin. **Shawinigan Resins Corporation**
BV—Oil-modified Alkyd. **Basic Varnish & Research Corp.**
BVA—Oil-modified Alkyd. **Basic Varnish & Research Corp.**

C

Cabarose Red—B.O.N. maroon. **B. F. Goodrich Chemical Co.**
Cab-o-sil—Silicon dioxide. **Godfrey L. Cabot, Inc.**
Caddy Red Toner R-6222—Pyrazolone reds. **B. F. Goodrich Chemical Co.**
Cadmolith—Cadmium red and yellow lithipones. **The Glidden Company**
Calcicoater Oil—Bodied Vegetable oil. **Pacific Vegetable Oil Corp.**
Calex—Emulsion Vehicle. **California Ink, Co., Inc.**
Calinate—Calcium soaps. **The Harshaw Chemical Company**
Calkyd—Alkyd Vehicle. **California Ink Co., Inc.**
Calo—Dipentene, pine oil, pitch. **John H. Calo Co.**
Caltrol—Viscosity controller. **Brown-Allen Chemicals, Inc.**
Calwhite—Calcium carbonate pigment. **The Georgia Marble Co.**
Carbitol—Solvent. **Union Carbide Chemicals Co.**
Carbo Blue—Iron blue dispersions. **Kentucky Color & Chemical Company**
Carbolac—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Carbopol—Water sensitive gum, paint thickener. **B. F. Goodrich Chemical Company**
Carbose—Sodium Carboxymethylcellulose. **Wyandotte Chemicals Corp.**
Cargillon—Polyester resins. **Cargill, Inc.**
Cargoils—Fish oil based oils for barn paints. **Cargill, Inc.**
Cascoloids—Latex Stabilizers. **The Borden Company**
Castorwax—Waxlike, hydrogenated castor oil. **Baker Castor Oil Co.**
Castung—Dehydrated castor oil. **Baker Castor Oil Co.**
C-D-M—Centrifugally Cast Dual Metal Rolls. **J. H. Lehmann Co., Inc.**
Celanese CL—Polyvinyl acetate emulsions. **Celanese Corporation of America.**
Celanese Solvent—Solvent. **Celanese Corporation of America**
Celite. Extender pigment, diatomaceous silica. **Johns-Manville Products Corp.**
Cellolyn—Abitol-derived alkyds and modified pentaerythritol esters of rosin. **Hercules Powder Company**
Cellosize—Hydroxyethyl Cellulose. **Carbide and Carbon Chemicals Co.**
Cellosolve—Solvent. **Carbide and Carbon Chemicals Company**
Century Colors—Vat colors. **Kentucky Color & Chemical Co.**
Century Red, Orange, Blue—Indanthrone colors. **Kentucky Color & Chemical Company**
Cerulean Blue—Cobalt pigment. **Harshaw Chemical Co.**
Charlotte—Colloid Mill. **Chemicolloid Laboratories Inc.**
Chembine—Ester of polyalcohol. **Naftone, Inc.**
Chempol—Resins. **Freeman Chemical Corp.**
Chemstor—Glass lined storage tanks. **The Pfaudler Company**
Cherokee—Kaolin Clay. **R. T. Vanderbilt Co.**
Chlorowax 40—Plasticizer; liquid chlorinated paraffin. **Diamond Alkali Company**
Chlorowax 70—Resinous chlorinated paraffin. **Diamond Alkali Company**
Cicoil—Oiticica oil **Brazil Oiticica, Inc.**
Cidao—Oiticica and castor oils. **Brazilian Industrial Oils, Inc.**
Citation Red—Permanent red 2-B, BON type. **Kentucky Color & Chemical Company**
Citro Deodorant—Paint deodorant. **Florida Molasses Corporation**
Citroflex—Citric acid ester plasticizers. **Chas. Pfizer & Co., Inc.**
CKR—Heat and non-heat hardening phenolic resins. **Bakelite Co.**
CKV—Phenolic dispersions. **Bakelite Co.**
Clearate—Lecithin. **W. A. Cleary Corp.**
CMC—Sodium carboxymethylcellulose. **Hercules Powder Company**
Coacetateblak—Carbon black cellulose acetate chips. **Columbian Carbon Co.**
Coacrylateblak—High color carbon black. **Columbian Carbon Co.**
Cobalt 254—Loss of dry inhibitor. **Nuodex Products Company, Inc.**
Cobalt Blue PX922—Cobalt aluminate. **The Harshaw Chemical Co.**
Coblac—Carbon black nitrocellulose dispersions. **Columbian Carbon Co.**
Codispersion—Carbon black dispersions in various vehicles. **Columbian Carbon Co.**
Coethloblak—Black chip of dispersed carbon black in ethyl cellulose. **Columbian Carbon Co.**
C-Oil—Hydrocarbon drying oil. **Enjay Company, Inc.**
Cold-Pro—Bleached Shellac. **Acme Shellac Products Company**
Coloidex—Surface treated carbon blacks. **Columbian Carbon Co.**
Color trend—Universal dispersions. **California Ink, Co., Inc.**
Common Sense—Disc filter. **Filpaco Industries**
Concord—Wet ground mica. **Concord Mica Corp.**
Concord Maroon—Deep BON Maroon. **Standard Ultramarine & Color Company**
Conoco—Petroleum solvent. **Continental Oil Co.**
Continental—Carbon Blacks. **Witco Chemical Company**
Continental—Kaolin Clay. **R. T. Vanderbilt Company**
Continex—Furnace carbon black. **Witco Chemical Company**
Coors—High density grinding media. **LZP Industrial Ceramics**
Coresin blak—Black pastes. **Columbian Carbon Co.**
Cosden—Solids. **Cosden Petroleum Corp.**
Cosden Polyvis—Polybutene. **Cosden Petroleum Corp.**
Cosol—High-flash naphtha. **Neville Chemical Company**
Covarnish blak—Dry powders. **Columbian Carbon Co.**
Covertex—Vehicles for emulsion paints and latex. **McCloskey Varnish Company**
Covinylblak—Dry chips. **Columbian Carbon Co.**
Cowles—Mixers. **Morehouse-Cowles Inc.**
CP Toluidine Maroon MT-1—Toluidine maroons. **B. F. Goodrich Chemical Co.**
CP Toluidine Toner RT-1—Toluidine reds. **B. F. Goodrich Chemical Co.**
CRCO—New Way—Labeling and packaging machines. **Chisholm-Ryder Co. of Pennsylvania**
Crilicon—Acrylic Emulsion. **Jersey State Chemical Co.**
Crosby—Maleic modified ester resin. **Crosby Chemicals, Inc.**
Crypton ZS—Zinc sulfide. **New Jersey Zinc Co.**
Crystal O—Castor oil. **Baker Castor Oil Co.**
CTLA—Heat-reactive, aromatic-type olefinic hydrocarbon polymer. **Enjay Company Inc.**
Cumar—Paracoumarone-indene resins. **Barrett Division**
Cunilate—Fungicides. **Scientific Oil Compounding Company Inc.,**
Cunimene—Fungicides. **Scientific Oil Compounding Company, Inc.**
Cuprous Oxide—Anti-fouling copper pigment. **The Glidden Co.**
Cyan Blue—Phthalocyanine blue. **American Cyanamid Co., Pigment Div.**
Cyanegg—Sodium cyanide. **E. I. du Pont de Nemours & Company, Inc.**
Cyaqua—Alkyd emulsion. **American Cyanamid Co.**
Cyclodex—An emulsifiable cobalt catalyst. **Nuodex Products Company, Inc.**
Cyclo Sol—Aromatic Solvents. **Shell Oil Company**
Cyclowhirl—Portable mixer. **The Kwerel Co.**
Cycolac—Styrene copolymer resin. **Marbon Chemical Division**
Cycopol—Copolymer Resins. **American Cyanamid Company**
Cykel—Dicyclopentadiene treated vegetable oil. **Spencer Kellogg & Sons Inc.**
Cykelin—Dicyclopentadiene treated linseed oil. **Spencer Kellogg & Sons Inc.**
Cykelsoy—Dicyclopentadiene treated soybean oil. **Spencer Kellogg & Sons, Inc.**
Cymel—Alkylated melamine-formaldehyde resins. **American Cyanamid Co.**
Cyzac—Hard resin. **American Cyanamid Co.**
C-8—Epoxy resins. **Bakelite Company**
C-10—Emulsion additive. **Apex Chemical Co.**
C-12—Resin for emulsions. **Farnow, Inc.**

D

Dag—Colloidal graphite dispersions. **Acheson Colloids Company**
Dapon—Diallyl phthalate prepolymer. **Ohio-Apex Division**
Darex Copolymer—Styrene Butadiene Copolymer. **Dewey & Almy Chemical Co.**
Darex D10P—Chemical Plasticizers. **Dewey & Almy Chemical Company**
Darex Everflex—Polyvinyl Acetate emulsion. **Dewey & Almy Chemical Company**
Darsol—Metal cleaner. **Decar Chemical Products Company**
Darvan—Dispersing Agents. **R. T. Vanderbilt Company**
Davenite—Water ground mica. **Hayden Mica Company**
Daxad—Dispersing Agent. **Dewey & Almy Chemical Co.**
Day—Mixers and roll mills. **J. H. Day Co.**
Drapex—Epoxy stearate plasticizer. **Argus Chemical Corp.**
Defoamer ED—Anti-Foam Agent. **El Dorado Oil Works**
Defoma—Anti-foaming agent. **Scher Bros.**
Dehydol—Nonionic surface active agent. **Fallek Products Company, Inc.**
Dehydrol—Dehydrated Castor Oil. **The Sherwin-Williams Co.**
DEO Oil—Deodorized fish oil. **Pacific Vegetable Oil Corp.**
Deodorized Apco—Deodorized aliphatic hydrocarbon thinner. **Anderson-Prichard Oil Corp.**
Deoxidine—Metal cleaners and rust removers. **American Chemical Paint Company**
Detrex 79—Cleaner & phosphate treatment for steel. **Detrex Corporation**
D.G.—Magnesium Silicate. **Tamms Industries, Inc.**
Diamond K—Oxidized oils. **Spencer Kellogg & Sons Inc.**
Dicalite—Diatomaceous Silica extender pigment. **Great Lakes Carbon Corporation**
Dicom—Dipentene. **Newport Industries, Inc.**
Dinopol—Plasticizer. **Ohio-Apex Division**
Dipentek—Dipentaerythritol technical. **Heyden Chemical Corporation**
Dipentene No. 122—Solvent—51% dipentene with other terpene hydrocarbons. **Hercules Powder Company**
DiscPerser—Mixer. **Herman Hockmeyer & Co.**
Disperse—Aqueous phase dispersant. **Raybo Chemical Company**
Disperso—Wettable metallic stearates. **Witco Chemical Company**
Dispersol—Insecticide base. **Shell Oil Company**
Dixie Perfecto—Carbon Black. **United Carbon Company, Inc.**
Dixie Reds—Toluidine and Para Substitutes. **Standard Ultramarine & Color Company**
DMT—Dimethyl terephthalate. **Hercules Powder Company**
Doubl—Limed wood rosin. **Newport Industries, Inc.**
Doubletite—Round friction top paint cans. **American Can Co.**
Dow Corning—Silicones. **Dow Corning Chemical Co.**
Dow Latex—Emulsion of either vinyl chloride, vinylidene chloride copolymer, styrene-butadiene copolymer, or polyvinylidene chloride. **The Dow Chemical Company**
Dowicides—Industrial germicide & fungicides. **Dow Chemical Company**
Dresinate—Surface active sodium and potassium salts of rosins and tall oil. **Hercules Powder Company**
Dri-Film—Silicone water-repellents. **General Electric Co.**
Drisoy—Treated soybean oil. **Spencer Kellogg & Sons Inc.**
Duol—Resinated Lithol Rubine pigment. **E. I. du Pont de Nemours & Company**
Duoreens—N-Alkyl Trimethylene diamines. **Armour Chemical Div.**
Duplex Disperser—Mixer disperser. **Troy Engine & Machine Co.**
Duplicane #517—Sugar cane wax. **Warwick Wax Company, Inc.**
Duraplex—Phthalic alkyd resins. **Rohm & Haas Company**
Duratone Reds—Toluidine and Para Substitutes. **Standard Ultramarine & Color Company**
Durez—Phenol-formaldehyde resins. **Durez Plastics & Chemicals, Inc.**
Dur Osyn—Isophthalic alkyd. **Specialty Resin Co.**

Duroxon—Soft Waxes. **Dura Commodities Corporation**
Dustex Micro-Silica—Soft amorphous silica. **Tamms Industries, Inc.**
Dutch Boy—Pigments—antimony oxide, calcium carbonate, barytes, white lead, red lead, litharge, linseed oils, chemical plasticizers. **National Lead Company**
Dutrex—Rubber plasticizers, softeners and extenders. **Shell Oil Co.**
Dryolene—Aliphatic petroleum thinner (VM&P). **Anderson-Prichard Oil Corporation**
Dyal—Alkyd resin. **The Sherwin-Williams Co.**
Dylan—Polyethylene. **Koppers Company, Inc.**
Dylex K-34—Styrene butadiene latex. **Koppers Company, Inc.**
Dymal—Maleic resin. **The Sherwin Williams Co.**
Dymerex—Dimerized wood rosin. **Hercules Powder Company**
Dypenite—Modified phenolic resin. **The Sherwin-Williams Co.**
Dyphene—Phenolic resin. **The Sherwin-Williams Co.**
Dyphos—Stabilizers for vinyls. **National Lead Company**

E

Eagle-Picher—Lead and Zinc Pigments. **The Eagle Picher Company**
Easy Ride—Conveyors. **Filpaco Industries**
EGD—Acrylic Monomer. **American Monomer Corporation**
EHEC—Ethylated hydroxethyl cellulose. **Hercules Powder Company**
EKS, EKR, ERL—Epoxy resins. **Bakelite Co.**
Elastex 40-P—Butyl iso decyl phthalate plasticizer. **Barrett Division**
Eldo—Fatty acids. **El Dorado Oil Works**
Electro-Vapor—Dowtherm Kettles. **Blaw-Knox Co.**
Elf—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Elftex—Oil furnace carbon blacks. **Godfrey L. Cabot, Inc.**
Elvacet—Polyvinyl acetate emulsion. **E. I. du Pont de Nemours & Company**
Elvadex—Vinyl acetate copolymer. **E. I. du Pont de Nemours & Company**
Elvanol—Polyvinyl alcohol resin. **E. I. du Pont de Nemours & Company**
Emco—Ball mills, pebble mills, unitized agitator drives. **Epworth Manufacturing Co.**
Emcol H-50A—Hydrocarbon Solvent Emulsifier. **The Emulsol Corporation**
Emerox—Dibasic acids. **Emery Industries, Inc.**
Emersol—Fatty acids made by selective solvent separation. **Emery Industries, Inc.**
Emery—Vegetable fatty acids. **Emery Industries, Inc.**
Emfac—Monobasic acids. **Emery Industries, Inc.**
Empol—Polymerized fatty acids. **Emery Industries, Inc.**
Emulphor—Nonionic surfactant. **Antara Chemicals**
Epi-Rez—Pure epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epi-Tex—Oil modified epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epi-Var—Oil modified epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epocast—Epoxy resins. **Furane Plastics, Inc.**
Epolene—Polyethylene waxes. **Eastman Chemical Prods., Inc.**
Epon—Epoxy resins. **Shell Chemical Corp.**
ERCO Brown—Concentrated brown iron oxides. **Reichard-Coulston, Inc.**
Espesol—Aromatic, aliphatic and intermediate solvents. **Eastern States Chemical Corp.**
Esskol—Refined linseed oil. **Spencer Kellogg & Sons Inc.**
Esso—Aliphatic petroleum solvents. **Esso Standard Oil Company**
Ester Gum 8D and 8L—Glycerol esters of pale wood rosin. **Hercules Powder Company**
Estynox—Epoxidized fatty ester plasticizers. **Baker Castor Oil Co.**
Ethocel—Ethyl Cellulose resins. **The Dow Chemical Company**
Ethofats—Surface active agents. **Armour Chemical Division**
Ethomeens—Surface active agents. **Armour Chemical Division**
Ethomids—Surface active agents. **Armour Chemical Division**
Euston White Lead—Basic carbonate of lead. **The Glidden Co.**
EVT-50—Styrene butadiene latex. **Cargill, Inc.**
EXBC—Polyvinyl Ethyl ether polymer. **Bakelite Company**
EXBM—Polyvinyl ethyl ether polymer. **Bakelite Company**
Excelsior—Carbon Black pigment. **Columbian Carbon Company**
Exkins—Volatile anti-oxidant. **Nuodex Products Company, Inc.**
Exon—Vinyl & Styrene Resins. **Firestone Plastics Company**
Extra Fine—Aluminum pastes and powders. **Silberline Mfg. Company, Inc.**

F

FA—Alkyds. **Farnow, Inc.**
FA—Furfuryl alcohol. **The Quaker Oats Co.**
Fade-Ometer—Sunfastness Testing Machine. **Atlas Electric Devices Company**
FAFL—Flat Alkyd Vehicle. **Farnow, Inc.**
Falk Soybean Oils—Soybean oils, (raw, bodied, blown, kettled and specialty). **Cargill, Inc.**
Falkidine—Hard drying fish oils. **Cargill, Inc.**
Falkolin—Linseed oils, (raw, bodied, blown, kettled and specialty). **Cargill, Inc.**
Falkomast—Fish and soybean oils specially processed for caulking compounds. **Cargill, Inc.**
Falklore—Esterified tall oils. **Cargill, Inc.**
Falkosoy—Maleinized soybean oils. **Cargill, Inc.**
Falkote—Maleic ester gums. **Cargill, Inc.**
Falkovar—Fish oils, (raw, bodied, blown kettled and specialty). **Cargill, Inc.**
Falkowood—Maleinized linseed oils and fish oils. **Cargill, Inc.**
Falkyd—Oil modified alkyd resins. **Cargill, Inc.**
Fanchon Yellow—Hansa Yellows. **B. F. Goodrich Chemical Co.**
Farac—Tall oil fatty acid. **Farac Oil & Chem. Co.**
Fastolux—Phthalocyanine green or blue toner. **Ansbacher-Siegle Corp.**
Fast Yellow—Yellow pigment. **R-B-H Dispersions.**
Fatchemco-O—Emulsifier. **Universal Chemicals Corporation**
Fax—Alkyd flat vehicle. **Farnow, Inc.**
FCD—Alkyd, phenolic, natural resins. **France, Campbell & Darling, Inc.**
FEGO—Enamel vehicle. **Farnow, Inc.**
Feon—Epoxy ester. **Farnow, Inc.**
Fer 3—Alkyd for emulsion and latex paints. **Farnow, Inc.**
Filmex—Solvent. **U. S. Industrial Chemicals Co.**
Fine—Organic dry colors. **Fine Colors Company**
Flexbond—Polyvinyl acetate emulsion. **The Colton Chemical Company**
Flexol—Plasticizers. **Union Carbide Chemicals Co.**
Flexowax C—Synthetic wax; anti-mar agent for lacquers. **Glyco Products Company, Inc.**
Flexricin—Castor oil—derived plasticizers. **Baker Castor Oil Co.**
Flextal—High rosin, non-crystallizing distilled tall oil. **Farac Oil & Chem. Co.**
Flexwall—Phthalic alkyd flat wall tall oil vehicle. **Farac Oil & Chem. Co.**
FloInducer—Levelling agent. **Raybo Chemical Company**
Flomax—Stabilizer. **National Lead Co.**
Florence—French Process Zinc Oxide. **New Jersey Zinc Company**
Flow-Master—Homogenizer. **Marco Company, Inc.**
Fluorethene — Polymonochlorotrifluoroethylene polymer. **Bakelite Company**
Foamex—Liquid defoaming agent. **Glyco Products Company, Inc.**
Fo-Glo—Rosin gloss oil. **Newport Industries, Inc.**
F-O-M—Float-O-Matic control of rolls. **J. M. Lehmann Company, Inc.**
Formcels—Formaldehyde solutions. **Celanese Corporation of America**
Formvar—Polyvinyl formal resin. **Shawinigan Resins Corporation.**
Fosbond—Phosphate coating and rust-proofing compound. **Pennsylvania Salt Manufacturing Company**
Fosfo—Limed wood rosin. **Newport Industries, Inc.**
Foster—Rotary Pumps. **Foster Pump Works, Inc.**
Fotocol—Proprietary Solvent. **Commercial Solvents Corporation**
FR-28—Sodium Borate, fire retardant. **Pacific Coast Borax Company**
Franklin—Pulverizers. **Franklin P. Miller & Son, Inc.**
Futura—Ball and pebble mill. **Patterson Foundry & Machine Co.**

G

Gafite—Polymethyl alphachloroacrylate. **General Aniline & Film Corp.**
Gamaco—Calcium carbonate pigment. **The Georgia Marble Co.**
Gamakal—Calcium carbonate pigment. **The Georgia Marble Co.**
Gelva—Polyvinyl acetate resins. **Shawinigan Resins Corporation**
Gelvatol—Polyvinyl acetate emulsions. **Shawinigan Resins Corporation**
Gen-Flo—Styrene butadiene emulsion. **The General Tire & Rubber Company**
Genesol #2, #6—Terpene solvent. **Newport Industries, Inc.**
Geon Latex—Polyvinyl chloride emulsions. **B. F. Goodrich Chemical Company**
Geon Resin—Polyvinyl chloride resins. **B. F. Goodrich Chemical Company**
GGP Aluminum Extra Brilliant—Flake Aluminum Powder. **U. S. Bronze Powder Works, Inc.**
Glaurin—Grinding aid and dispersing agent. **Glyco Products Company, Inc.**
Globlak—Carbon black—nitrocellulose chip. **Columbian Carbon Co.**
Glycosperse—Emulsifying agent. **Glyco Products Co.**
Glyptal—Alkyd resins. **Archer-Daniels-Midland Co.**
G.N.S. #5—Pine Oil. **Newport Industries, Inc.**
Go Getter—Electric lift truck. **Revolvator Co.**
Gold Bond "R" Silica—Amorphous Silica. **Tamms Industries, Inc.**
Gold Drops—Gold dispersions for lacquers. **B. F. Goodrich Chemical Co.**
Good-Rite—Salts of polyacrylic acid. **B. F. Goodrich Chemical Co.**
GPF—Containers. **Geuder-Paeschke & Frey Co.**
Grandodraw—Zinc-phosphate coating chemicals for cold-forming. **American Chemical Paint Company**
Granodine—Zinc-phosphate coating chemicals for bonding paint to steel. **American Chemical Paint Company**
Green-Pond—Lightfast yellow pigment. **E. I. du Pont de Nemours & Co., Inc.**
Grellow—Special lead chromate for green. **Kentucky Color & Chemical Company.**
Grip-Tight—Labeling Paste. **Morningstar-Paisley Products, Inc.**
Groco—Fatty acids. **A. Gross & Company**
GRP—Shellacs. **Gillespie-Rodgers-Pyatt Co. Inc.**
Gulf—Aliphatic petroleum solvents. **Gulf Oil Corporation**
Guyandot Red Toners—Toluidine Substitutes. **Standard Ultramarine & Color Company**

H

Half-second Butyrate—Cellulose acetate butyrate resin. **Eastman Chemical Products, Inc.**
Halowax—Chlorinated naphthalene waxes. **Bakelite Company**
Harflex—Plasticizers. **Harchem Division**
Harshaw-V—Vinyl Stabilizers. **The Harshaw Chemical Company**
HB-20, 40—Alkyl-aryl type plasticizers. **Monsanto Chemical Company**
Heliogen—Phthalocyanine blue and green pigments. **General Dyestuff Corp.**
Helix—Limed wood rosin. **Newport Industries, Inc.**
Hercoflex—Chemical plasticizers. **Hercules Powder Company**
Hercolyn—Hydrogenated methyl ester of rosin. **Hercules Powder Company**
Hetron—Polyester resins. **Hooker Electrochemical Company**
Hexogen—Paint driers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Hi-Brite—Fluorescent products. **Shannon Luminous Materials Co.**
Hi-fax—Polyethylene coating. **Hercules Powder Co.**
Hifos—Limed wood rosin. **Newport Industries, Inc.**
HiSolv Solvents—Petroleum Aromatic solvents. **Pennsylvania Industrial Chemical Corp.**
HiWhite—Airfloated Georgia kaolinite. **J. M. Huber Corp.**
Horse Head—Zinc pigments. **New Jersey Zinc Company**
HR Cobalt 254—A cobalt "feeder" drier. **Nuodex Products Company, Inc.**
HTS—Basic Carbonate White lead. **National Lead Company**
Hycryl—Polyacrylate UBS Chemical Corp.
Hydrasperse—Aluminum silicate extender pigment. **J. M. Huber Corp.**
Hydratex—Aluminum silicate extender pigment. **J. M. Huber Corp.**
Hydrofol—Glycerides & fatty acids. **Archer-Daniels-Midland Company**
Hydro-Lock—Conversion unit. **Blach Indus-**
Hydro-Magna—A suspension of magnesium hydroxide. **Merck & Co., Inc.**
Hyfac—Hydrogenated fatty acid. **Emery Industries, Inc.**
Hypalon—Methacrylic ester polymers and chlorosulfonated polyethylene elastomer. **E. I. du Pont de Nemours & Company**
Hyprin—Plasticizer, chemical intermediate. **Dow Chemical Co.**
Hydros—Heat-treated wood rosin. **Newport Industries, Inc.**
Hy-R-Speed—Mills. **Hy-R-Speed Inc.**
Hy-Speed—Agitators & Mixers. **Alsop Engineering Corporation**
Hywax—Fatty alcohol. **Werner G. Smith**

I

I Style—Oblong paint can with screw neck or Neuman opening. **American Can Co.**
IAF Compound—Anti-floating agent. **Imperial Paper & Color Corp.**
Iceberg—Aluminum Silicate Pigments. **Burgess Pigment Company**
Igepal—Emulsifiers. **Antara Chemicals**
Igepon—Wetting & dispersing agents. **Antara Chemicals**
Imperial Colors—Pigments. **Imperial Paper & Color Corp.**
Imperse—Pigment dispersion. **Imperial Paper & Color Corp.**
Impervite—Centrifugal pumps. **Falls Industries, Inc.**
Indo Blue B-1—Indanthrene blues. **B. F. Goodrich Chemical Co.**
Indo Marron MV-6601—Thio Indigoid maroon. **B. F. Goodrich Chemical Co.**
Indopol—Liquid polybutenes. **Indoil Chemical Company**

Indulin 70-GR-S—Coprecipitate of lignin and a butadiene-styrene copolymer. **West Virginia Pulp and Paper Company**
Indusoil—Distilled tall oil. **West Virginia Pulp & Paper Company**
International—Mixers. **International Engineering, Inc.**
Iosol—Spirit soluble dyes. **National Aniline Division**
Iridite—Chromate conversion coatings. **Allied Research Products, Inc.**
Iron Red—Calcined synthetic yellow oxide. **Reichard-Coulston, Inc.**
Iron Yellow—Precipitated pure yellow oxide. **Reichard-Coulston, Inc.**
Irox—Iron oxides. **Reichard-Coulston, Inc.**
Irrathene—Irradiated polyethylene. **General Electric Co.**
Isco Amorphous Silica—Extender pigment. Silica. **Innis, Speiden & Company, Inc.**
Isofoam—Polyisocyanate foaming resin. **Isocyanate Products, Inc.**
Ivo—Bone blacks. **Columbian Carbon Co.**

J

Jaysol—Isopropyl alcohol. **Enjay Company, Inc.**
Jet—Mixers. **Herman Machinery Co., Inc.**
Jet Mill—High speed dispersion mill for liquids. **Patterson Foundry & Machine Company**

K

Kadox—Finest particle size Zinc Oxides. **New Jersey Zinc Co.**
Kady Mills—Dispersion Milling Equipment. **Kinetic Dispersion Corporation**
Kaolinites — Hydrated aluminum silicates. **Georgia-Kaolin Co.**
Kapsol—Plasticizer. **Ohio-Apex Division**
Kaymol—Surface active agent emulsifier, anti-foaming agent. **Kraft Chemical Company**
KCC—Talc type extender. **Kraft Chemical Co.**
Kelcosol—Fibrous refined, high viscosity sodium alginate. **Kelco Co.**
Kelecin—Surface active agent. **Spencer Kellogg & Sons, Inc.**
Kel-F—Trifluorochloroethylene polymer. **The M. W. Kellogg Company**
Kellin—Refined linseed oil. **Spencer Kellogg & Sons Inc.**
Kel-sol—Universal tinting vehicle. **Spencer Kellogg & Sons Inc.**
Keltex—Granular high viscosity sodium alginate. **Kelco Co.**
Keltrol—Styrenated linseed and soybean oils, vinyltoluene copolymer. **Spencer Kellogg & Sons Inc.**
Kel-Vi-Tol—Linseed varnish oil. **Spencer Kellogg & Sons Inc.**
Kel-X-L—Treated linseed oil. **Spencer Kellogg & Sons Inc.**
Kenflex A—Polymer of aromatic hydrocarbons. **Kenrich Corp.**
Kenite—Extender pigment; diatomaceous earth. **Innis, Speiden & Co., Inc.**
Kneadermaster—Dispersion type mixer. **Paterson Foundry & Machine Company**
Koflex—Plasticizers and defoamers. **Kolker Chemical Corp.**
Kopol—Congo copal resins. **Reichhold Chemicals, Inc.**
Koresin—Condensation product of p-tertiary butyl phenol with acetylene. **General Dyestuff Corp.**
Korp—Soda-treated wood rosin. **Newport Industries, Inc.**
Kosmolak—Carbon black. **United Carbon Co., Inc.**
Kosmos F-4, BB, 1—Carbon black. **United Carbon Co., Inc.**
KP—Plasticizer. **Ohio-Apex Div.**
KPO—Polymerized linseed oils. **Spencer Kellogg & Sons Inc.**
Kralastic—Styrene-butadiene resins. **Naugatuck Chemical**
Kreelon—Emulsifying wetting and penetrating agent (Anionic). **Wyandotte Chemicals Corp.**
Kromall—Pigment dispersions. **Kromall Chemical & Dispersions Corp.**
Kroma Reds—Pure precipitated red iron oxides. **C. K. Williams & Co.**
Kronisol—Chemical plasticizers. **Ohio-Apex Div.**
Kronitex—Chemical plasticizers. **Ohio-Apex Div.**
Krumbhaar—Phenolic resins. **Krumbhaar Chemicals Inc.**
KTPL—Low molecular weight polystyrene resins. **Koppers Company, Inc.**
K.V.O.—Linseed varnish oils. **Spencer Kellogg & Sons Inc.**

L

Lactol Spirits—An aliphatic naphtha in the toluol evaporation range. **American Mineral Spirits Company**
Laminac—Unsaturated polyester resins. **American Cyanamid Company**
Landora—Soda-treated wood rosin. **Newport Industries, Inc.**
Lauxein—Casein and soybean adhesives. **Monsanto Chemical Co.**
Lauxite—Urea, phenolic, melamine, and resorcinol resins. **Monsanto Chemical Company**
"L" China Clay—China clay. **Tamms Industries, Inc.**
L. C. Lin—Low cost bodied linseed oil. **Brown-Allen Chemicals, Inc.**
Lehigh—Leaded zinc oxide. **New Jersey Zinc Company**
Lemac—Polyvinyl acetate. **The Borden Co.**
Lemol—Polyvinyl alcohol. **The Borden Co.**
Lewisol—Maleic alkyd-modified rosin esters. **Hercules Powder Company**
Lightnin—Mixers. **Mixing Equipment Co., Inc.**
Lignocol—Anti-skinning agent and anti-oxidant. **Heyden Chemical Corporation.**
Ligrene—Crude tall oil substitute. **West Virginia Pulp & Paper Co.**
Ligro—Crude tall oil. **West Virginia Pulp & Paper Company**
Lindol—Low color tricresyl phosphate. **Celanese Corporation of America**
Linoresinate—Tall oil type driers. **The Harshaw Chemical Company**
Linstyrol—Styrenated linseed oil. **Spencer Kellogg & Sons Inc.**
Liquiflow—Low pressure bulk CO_2. **Liquid Carbonic Corp.**
Lithoform—Zinc-phosphate coating chemicals for bonding paint to zinc. **American Chemical Paint Company**
Lithol Rubine Toners—Lithol rubines. **B. F. Goodrich Chemical Co.**
Lo-Micron—Barytes. **Whittaker, Clark & Daniels, Inc.**
Lo-Odor—Octasol driers. **The Harshaw Chemical Company**
Lorite—Diatomaceous material. **National Lead Company**
Lorol—Fatty alcohols. **E. I. du Pont de Nemours & Company**
LP-2—Polysulfide hydrocarbon resins. **Thiokol Corporation**
LPR-1—Latex additive. **Naftone, Inc.**
Lucite—Methyl methacrylate resin. **E. I. du Pont de Nemours & Company**
Lumigraphic colors—Special organic colors fluorescing in daylight or under ultraviolet light. **Imperial Paper and Color Corporation**
Luncor PVC—Polyvinyl chloride valves. **Lunkenheimer Company**
Lustrelith—Lithopone. **Chemical Pigment Co.**
Lustrex—Polystyrene resins. **Monsanto Chemical Company**
Lustrex Latex—Polystyrene emulsion. **Monsanto Chemical Company**
Lytron—Interpolymer and styrene latices and resins for surface coatings and latex paints. **Monsanto Chemical Co.**

M

MA 28-18—Vinyl alcohol-acetate resins. **Bakelite Co.**
Maglite—Reactive magnesium oxide. **Merck & Co., Inc.**
Magnaflake—Metal Powders and Pastes. **Magna Manufacturing Company, Inc.**
Majestic Yellow—Permanent benzidine yellow. **Imperial Paper & Color Corp.**
Makanol—Unsaturated fatty alcohols. **The Stepan Chemical Company**
Malix 138—Limed wood rosin. **Newport Industries, Inc.**
Mammopol—Modified fish oil. **Pacific Vegetable Oil Corp.**
Mapico—Iron oxide pigments. **Columbian Carbon Company**
Marbon 9200—Styrene copolymer resin & pigment chips. **Marbon Chemical Division**
Marco—Unsaturated polyester resins. **Celanese Corporation of America**
Marcothix—Unsaturated polyester resin. **Celanese Corporation of America**
MarHard—Mar proofing agent. **Raybo Chemical Company**
Marlex—Polyethylene. **Phillips Petroleum Co.**
Marlin Maroon—Yellowish BON maroon. **Standard Ultramarine & Color Company**
Maroc 6—Limed wood rosin. **Newport Industries, Inc.**
Maroon-gold—Transparent durable maroon pigment. **E. I. du Pont de Nemours & Co., Inc.**
Marvinol—Polyvinyl chloride resin. **Naugatuck Chemical**
Maskit #2—Paint deodorant. **Aromatic Products, Incorporated**
M C—Catalyst for unsaturated polyester resins. **Celanese Corporation of America**
M D—Aluminium powders & pastes. **Metals Disintegrating Company Inc.**
M.D.A.—Methylene disalicylic acid. **Heyden Chemical Corporation**
Meadol—Lignin. **The Mead Corporation**
Melmac—Melamine-Formaldehyde resins. **American Cyanamid Company**
Mercadmolith Reds—Cadmium-Mercury colors. **The Glidden Co.**
Mersolite—Fungicides phenyl mercury salts. **Innis, Speiden & Co., Inc.**
Mert ZT—Fungicide. **Carolina Aniline & Extract Company**
Metalead—Metallic lead flakes. **Metalead Products Corporation**
Metasap—Suspending agent. **Nopco Chemical Company**
Methac—Methyl acetate-methanol. **The Borden Company**
Methocel—Methyl cellulose. **The Dow Chemical Company**
Methox—Plasticizer. **Ohio-Apex Div.**
Methyl acetone—Methyl acetate-methanol-acetone. **The Borden Company**
Methylac—Methyl acetate solvent. **The Colton Chemical Company**
Methylon—Chemical resistant coating intermediates. **General Electric Co.**
Metrolin—Enamel and paint vehicle. **Brown-Allen Chemicals, Inc.**
Metso 99—Surface active agents. **Philadelphia Quartz Company**
Micro—Cel—Synthetic calcium silicates. **Johns-Manville**
Micro-Klean—Micronic disposable filter cartridge. **The Cuno Engineering Corp.**
Micro-Mica—Finely ground micronized mica **The English Mica Company**
Micro Stardust—Magnesium silicate. **Tamms Industries, Inc.**
Micro Velva—Calcium carbonate extender pigment. **Carbola Chemical Company**
Midas Gold—Gold pigment. **R-B-H Dispersions**
Mikro—Milling machinery. **Pulverizing Machinery Company**
Mill—Limed wood rosin. **Newport Industries, Inc.**
Miller—Crushers. **Franklin P. Miller & Sons, Inc.**
Milmer—Fungicides. **Monsanto Chemical Co.**
Ming Orange—Molybdate orange. **Kentucky Color & Chemical Company**
Mintrol Spirits—A new mineral spirits with a very mild odor. **American Mineral Spirits Co.**
Mirares—Rosin. **Crosby Chemicals, Inc.**
Mirasol—Alkyd resins. **C. J. Osborn Company**
Mixall Mixers—Claw mixing propellers. **Craddock Equipment Company, Inc.**
Mix Mor—Mixers. **Hy-R-Speed, Inc.**
Macatawa Red Tone—Lithol ruliene pigment. **Holland Color & Chemical Co.**
Mod col VD—Synthetic thickener for latex paints. **Nopco Chemical Company**
Mogul—Carbon black pigments. **Godfrey L. Cabot, Inc.**
Molacco—Carbon black pigment. **Columbian Carbon Company**
Molora Maroon—Light BON maroon. **Standard Ultramarine & Color Company**
Monamine—Surface active agents. **Mona Industries, Inc.**
Monarch—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Monarch—Copper phthalocyanine blue and green. **Imperial Paper & Color Corp.**
Monochrome Greens—Pigments; co-precipitated phthalocyanine blue and chrome yellow. **Imperial Paper and Color Corporation**
Monastral—Copper phthalocyanine blue and green. **E. I. du Pont de Nemours & Company**
Mondur—Isocyanate. **Mobay Chemical Co.**
Monopentek — Monopentaerythritol. **Heyden Chemical Corporation**
Monoplex—Monomeric ester plasticizers. **Rohm & Haas Company**
Monosulph—Emulsifier for water-based paints. **Nopco Chemical Company**
Montclair Red—Naphthol red toner. **Ansbacher-Siegle Corp.**
Morehouse—Grinding mills. **Morehouse-Cowles Inc.**
Morningstar—Starches and Dextrines. **Morningstar, Nicol, Inc.**
M-P-A—Heat-stable specialty paint additive. **Baker Castor Oil Co.**
MPL Monomer—Autopolymerizable acrylic monomer. **The Borden Company**
M R—Unsaturated polyester resins. **Celanese Corporation of America**
MS2—Alicyclic ketone resin. **Howards & Sons Ltd.**
Multicel—Diatomaceous earth. **Tamms Industries, Inc.**
Multiflex—Calcium carbonate extender pigments. **Diamond Alkali Company**
Multigrip—Steel safety floor plate. **United States Steel Corporation**
Multi-wash—Fume control. **Claude B. Schneible Company**
Multron—Polyester. **Mobay Chemical Co.**
Munn—Soda-treated wood rosin. **Newport Industries, Inc.**
Myverol—High-potency distilled monoesters. **Distillation Products Industries**

N

Naccolene Concentrate—Detergent. **National Aniline Division**
Nacconate—Diisocyanates. **National Aniline Division**
Nacconols—Detergents. **National Aniline Div.**
Naccosol—Wetting agents. **National Aniline Division**
Naccotan—Dispersing agent. **National Aniline Division**
Nacromer—Pearl essence. **The Mearl Corp.**
Nadic—Dicarboxylic acid. **National Aniline Division**
Nalzin—Stabilizer. **National Lead Co.**
Natural-Shape Media—High density grinding media. **LZP Industrial Ceramics**
Naugatex—Copolymer latex. **Naugatuck Chemical Div., U. S. Rubber Co.**
Nebony—Thermoplastic hydrocarbon resins. **Neville Chemical Company**
Neo-fats—Fatty acids. **Armour Chemical Div.**
Neolyn—Rosin derived alkyd resin. **Hercules Powder Company**

Neo Spectra—Carbon black pigment. **Columbian Carbon Company**

Neosol—Ethyl alcohol proprietary solvent. **Shell Chemical Corporation**

Nestaco—Potato starch. **Morningstar, Nicol Inc.**

Nettco—Agitating equipment. **New England Tank & Tower Company**

Nevillac—Phenol-modified coumarone and alkylated phenols. **Neville Chemical Company**

Nevindene—Coumarone-indene resins. **Neville Chemical Company**

Nevinol—Plasticizing and solvent oils. **Neville Chemical Company**

Nevsolv—Aromatic petroleum solvents. **Neville Chemical Company**

Newport Maroon—Transparent double maroon pigment. **E. I. du Pont de Nemours & Co., Inc.**

Newtrex—Special wood rosin. **Newport Industries, Inc.**

N-Glo-5&5Y—Rosin gloss oil. **Newport Industries, Inc.**

Nildew—Fungicides. **Naftone, Inc.**

Nilskin—Anti-skinning agent. **Naftone, Inc.**

Non-fer-Al—Calcium carbonate extender pigments. **Diamond Alkali Company**

Non-Flocculating Green—Phthalocyanine greens. **B. F. Goodrich Chemical Co.**

Nonic—Surface active agents. **Industrial Div., Pennsalt**

Nonisols—Surface active agent. **Geigy Industrial Chemicals**

Nopco—Anti-foam agents, freeze-thaw stabilizers, wetting agents. **Nopco Chemical Company**

Nopco 1572-R—Polyvinyl acetate emulsion. **Nopco Chemical Company**

Nopcote—Polyamide resins. **Nopco Chemical Company**

Nora—Soda-treated wood rosin. **Newport Industries, Inc.**

Norlin—Catalytically polymerized linseed and soybean oils. **Cargill, Inc.**

Normasol—Stabilizers for vinyls. **National Lead Company**

Norvan—Polyvinyl acetate emulsions. **R. T. Vanderbilt Company**

Nox-Rust—Corrosion inhibitor. **Danbert Chemical Co.**

NPA—Semi-alkyd vehicles. **Farnow, Inc.**

Nuact Paste—Lead "feeder" drier. **Nuodex Products Company, Inc.**

Nuade—Grinding aid. **Nuodex Products Co., Inc.**

Nuba—Coumarone-indene resins. **Neville Chemical Company**

Nulix-15—Limed polymerized wood rosin. **Newport Industries, Inc.**

Nullapon—Sequestering agents. **Antara Chemicals**

Nulskin—Discontinued name for anti-skinning agent. **Raybo Chemical Company**

Nuodex—Fungicides and driers. **Nuodex Products Company, Inc.**

Nuogel A. O.—Thickening agent. **Nuodex Products Company, Inc.**

Nuolates—Tallate driers. **Nuodex Products Company, Inc.**

Nuomix—Surface active agent. **Nuodex Products Company, Inc.**

Nuospet—Non-toxic paint preservative. **Nuodex Products Company, Inc.**

Nuosperse 657—A combination of surface active agents. **Nuodex Products Company, Inc.**

Nuozene—Sanitizing agent. **Nuodex Products Company, Inc.**

Nuroz—Polymerized wood rosin. **Newport Industries, Inc.**

Nuvis—Bodying agents. **Nuodex Products Company, Inc.**

Nyco Super—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Nycolime—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Nylocet—fire-proofing agent. **Scher Bros.**

Nytal—Talc. **R. T. Vanderbilt Company**

O

Octasol—Driers. **The Harshaw Chemical Co.**

Ohopex—Plasticizer. **Ohio-Apex Division**

Oitioil—Oiticica oil. **Brazil Oiticica, Inc.**

OKO—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**

ONB—Ortho-nitrobiphenyl plasticizer. **Monsanto Chemical Company**

One Point—High speed mills. **Troy Engine & Machine Co.**

Oolitic—Dry milled calcium carbonates. **DeLore Div., National Lead Co.**

OO Silica Smoke—Amorphous Silica. **Tamms Industries, Inc.**

Opalon—Vinyl chloride resin. **Monsanto Chemical Company**

Oronite—Polybutene. **Oronite Chemical Co.**

Orthophen—Amyl phenols for antiskinning. **Industrial Div., Pennsalt**

Orthotone Orange—Ortho-Nitraniline orange. **Standard Ultramarine & Color Company**

Ozlo—Leaded zinc. **The Sherwin-Williams Co.**

P

Paco Solvent TR 590—Proprietary alcohol solvent. **Publicker Industries, Inc.**

Paideos—Paint deodorants. **Dodge & Olcott, Inc.**

Paint Base Oil—Special pigmented base oil. **Pacific Vegetable Oil Corp.**

Paintodors—Paint deodorants. **Sindar Corporation**

Paisflex—Polyvinyl acetate resin paint base (internally plasticized). **Morningstar-Paisley, Inc.**

Paisley—General line of liquid labeling glues. **Morningstar-Paisley, Inc.**

Palconate—Surface active agent. **The Pacific Lumber Company**

Palcotan—Surface active agent. **The Pacific Lumber Company**

Panaflex BN—Hydrocarbon plasticizer. **Pan American Chemicals**

Panapol—Synthetic hydrocarbon drying oils. **Pan American Chemicals**

Panarez—Petroleum hydrocarbon resins. **Pan American Chemicals**

Panasol—High solvency aromatic solvents. **Pan American Chemicals**

Paradene—Coumarone-indene resins. **Neville Chemical Company**

Paragon—Kaolin. **J. M. Huber Corp.**

Paraplex—Plasticizers and polyester resins. **Rohm & Haas Company**

Parapol-S—High molecular weight copolymer of styrene and isobutylene. **Enjay Company, Inc.**

Parasepts—Anti-fungal and anti-bacterial agents. **Heyden Chemical Corporation**

Paricin—Saturated fatty ester plasticizers. **Baker Castor Oil Co.**

Parlon—Chlorinated natural rubber. **Hercules Powder Company**

Pastall—Driers. **The Harshaw Chemical Co.**

Pavoco Oil—Bodied linseed oil. **Pacific Vegetable Oil Corp.**

Pavoil—Bodied oil. **Pacific Vegetable Oil Corp.**

Pavolene—Refined linseed oil. **Pacific Vegetable Oil Corp.**

Pavolin Oil—Bodied linseed oil. **Pacific Vegetable Oil Corp.**

Pavasoy—Bodied soybean oil. **Pacific Vegetable Oil Corp.**

Pavosynth—Modified linseed oil. **Pacific Vegetable Oil Corp.**

Paxwax—Microcrystalline waxes. **National Wax Company**

PC 1244—Defoaming agent. **Monsanto Chemical Company**

PCP Castor Oil—Raw expeller oil, unbleached. **Pacific Vegetable Oil Corp.**

PE—Polyhydric alcohol. **Hercules Powder Co.**

PE-16—Emulsion of chlorinated natural rubber. **Alfred Hague & Company, Inc.**

Peerless—Kaolin clay. **M. T. Vanderbilt Co.**

PEFA—Esterified distilled tall oils. **Crosby Chemicals, Inc.**

PEI—Polyethylene imine. **Hansborg & Company**

Penbro—"B" wood resin. **Newport Industries, Inc.**

Penbro 83—Linseed wood rosin. **Newport Industries, Inc.**

Penglo 65—Tall oil penta ester solution. **Newport Industries, Inc.**

Pennco—Pigment dispersions & chips. **Pennsylvania Color & Chemical Company**

Pennsalt—Metal cleaners, alkaline paint strippers, and paint spray booth water conditioners. **Pennsylvania Salt Manufacturing Company**

Penola—Aliphatic and Aromatic Solvents, Naphthas and Varsols. **Penola Oil Company**

Penros—Polymerized wood rosin. **Newport Industries, Inc.**

Pent Acetate—Synthetic amyl acetate. **Industrial Div., Pennsalt**

Pentacite—Pentaerythritol resins. **Reichhold Chemicals, Inc.**

Pentalyn—Pentaerythritol esters of rosin and phenolic-modified pentaerythritol esters of rosin. **Hercules Powder Company**

Pentasol—Synthetic amyl alcohols. **Industrial Div., Pennsalt**

Pentek—Pentaerythritol technical. **Heyden Chemical Corporation**

Perclene—Perchlorethylene. **E. I. du Pont de Nemours & Co., Inc.**

Perlin—Chemically treated linseed oil. **Brown-Allen Chemicals, Inc.**

Permachlor Red—Red dry colors. **Sherwin Williams Company**

Permadine—Zinc phosphate coating chemicals for rust-proofing. **American Chemical Paint Co.**

Permagel—Processed Fullers Earth thickener. **Minerals & Chemicals Corp. of America**

Permaline Blue—Phthalo Lake. **Whittaker, Clark & Daniels, Inc.**

Permanent—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Permansa—Nitroso naphthol green, chlor-para nitraniline red, and hansa yellow. **The Sherwin-Williams Co.**

Permolith—Lithopone. **The Sherwin-Williams Co.**

Petrex—Unmodified Petrex alkyd resins. **Hercules Powder Co.**

Petro A A—Surface active agent. **Petrochemicals Company**

Petrodor—Paint solvent deodorants. **Dodge & Olcott, Inc.**

Petrohol—Isopropyl alcohol. **Enjay Company, Inc.**

Petrolene—Aliphatic petroleum thinner. **Anderson-Prichard Oil Corporation**

Petrolite—Emulsifiable waxes. **Petrolite Corporation, Ltd.**

Petronauba—Emulsifiable petroleum wax. **Bareco Oil Company**

Petropon—Heavy petroleum polymers. **American Mineral Spirits Company**

Petro-Resins—Polymerized olefinic hydrocarbons. **Petroleum Specialties Company**

Petrosul—Petroleum sulfonate. **Pennsylvania Refining Company**

Petrothene—Polyethylene resins. **U. S. Industrial Chemicals Co.**

Phillips 66—Hydrocarbon solvents. **Phillips Petroleum Company**

Phthalo—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Picco—Solvents & Solvent oils. **Pennsylvania Industrial Chemical Corporation**

Piccoflex—Hydrocarbon copolymer resin. **Pennsylvania Industrial Chemical Corp.**

Piccolastic—Low molecular wt. polystyrene resins. **Pennsylvania Industrial Chemical Corp.**

Piccolyte—Polyterpene resins. **Pennsylvania Industrial Chemical Corporation**

Piccopale—Petroleum hydrocarbon resin. **Pennsylvania Industrial Chemical Corporation**

Piccopale Emulsion—Petroleum hydrocarbon resin emulsion. **Pennsylvania Industrial Chemical Corporation**

Piccoumaron—Coumarone-Indene resins. **Pennsylvania Industrial Chemical Corporation**

Piper Red—Pyrazalone red. **Ansbacher-Siegle Corp.**

P-K—Twin shell blender. **The Patterson-Kelly Company, Inc.**

Placco-Tex—Latex emulsion. **Pioneer Latex & Chemical Co.**

Planisol—Surface active agent. **The Girdler Company**

Plaskon—Alkyd molding compounds. **Barrett Division**

Plasti-Kote—Aerosol paints. **Plastic-Kote, Inc.**

Plasto—Dyes for plastics. **National Aniline Div.**

Plastoflex—plasticizers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works Inc.**

Plastolein—Chemical & resinous plasticizers. **Emery Industries Inc.**

Pliolite latex—Styrene-butadiene emulsions. **The Goodyear Tire & Rubber Co. Inc.**

Pliolite, natural rubber—Cyclized natural rubber. **The Goodyear Tire & Rubber Co. Inc.**

Pliolite S-5—Styrene-butadiene resins. **The Goodyear Tire & Rubber Co. Inc.**

Pliovic—Polyvinyl chloride resins. **The Goodyear Tire & Rubber Co. Inc.**

Plumb-O-Sil—Stabilizers for vinyls. **National Lead Company**

Pluronics—Emulsifying agent (nonionic). **Wyandotte Chemicals Corp.**

Plymouth—Stearates. **M. W. Parsons-Plymouth Inc.**

Plyophen—Phenolic resins. **Reichhold Chemicals, Inc.**

PMAC—High boiling solvent-polymethoxy acetal. **General Aniline & Film Corporation**

PMN-10—Fungicide. **Nuodex Products Co., Inc.**

PMO 10—Fungicide. **Nuodex Products Co., Inc.**

POE—Modified polyester enamel vehicle. **Farnow, Inc.**

Polycin—Gelled castor oil. **Baker Castor Oil Co.**

Polyco—Resin emulsions. **The Borden Company**

Polyfon—Surface active agents. **West Virginia Pulp and Paper Company**

Polyite—Polyester Resins. **Reichhold Chemicals, Inc.**

Polymekon—Specially processed petroleum wax. **Warwick Wax Company, Inc.**

Polymer C-3—Modified vinyl acetate resin. **Monsanto Chemical Co.**

Polyox—Water soluble resin. **Union Carbide Chemicals Co.**

Poly-pale Ester—Glycerol ester of polymerized rosin. **Hercules Powder Company**

Poly-Sperse—Plasticizer. **National Polychemicals, Inc.**

Poly-Tex—Polyvinyl acetate copolymer emulsion. **Jones-Dabney Company**

Polywood Oil—Heat treated wood oil. **Brown-Allen Chemicals, Inc.**

Porox—Grinding balls. **Patterson Foundry & Machine Company**

Potters—Reflective spheres. **Potters Brothers, Inc.**

Preventol—Fungicides. **Antara Chemicals**

Prgmol—Latex emulsion leveling agent. **Fred'k. A. Stresen-Reuter, Inc.**

Propocel—Cellulose derivative. **The Dow Chemical Company**

Protatek 53—Sodium alginate thickener. **Croda Incorporated**

Protectoseal—Equipment for protection against fires through the use of flammable liquids. **Protectoseal Company**

Protovacs—Cascinates. **The Borden Company**

PT—Pine tar, pine tar oil, pine oil, destructively distilled wood turpentine. **Godfrey L. Cabot, Inc.**

Puratized OL-28—Phenylmercury oleate. **Gallowhur Chemical Corporation**

Purecal—Ppt. calcium carbonate. **Wyandotte Chemicals Corp.**

Putrol—Deodorant. **Fritzsche Brothers, Inc.**

PVC 100—Polyvinyl chloride. **The Dow Chemical Company**

PVM—Polyvinyl methyl ether. **General Ahiline & Film Corp.**

PVM/MA—Methyl vinyl ether-ethyl anhydride copolymers. **General Aniline & Film Corp.**

PVP—Polyvinyl pyrrolidone. **General Aniline & Film Corp.**
PX Plasticizers—Chemical and Resinous Plasticizers. **Pittsburgh Coke & Chemical Co.**
Pycal—Chemical Plasticizers. **Atlas Powder Co.**
Pyrax—Foliated aluminum silicate. **Standard Mineral Corp.**
Pyropel—Fire-proofing agent. **Scher Bros.**
Pyrotone Reds—Chlorinated para toners. **Standard Ultramarine & Color Company**

Q

QO—Furan chemicals & derivatives. **The Quaker Oats Company**
Quindex—Copper-8 quinolinolate solution. **Nuodex Products Co., Inc.**
QYNV—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Bakelite Co.**

R

R-856 Resin—Silicone-alkyd resin. **Dow Corning Corp.**
R-878 Resin—Silicone-alkyd resin. **Dow Corning Corp.**
Radiant Yellow—AAOT benzidine yellow toner. **Ansbacher-Siegle Corp.**
Ramapo—Resinated organic pigments. **E. I. du Pont de Nemours & Company**
R & R—Bodying and surface active agents. **Ross & Rowe, Inc.**
Raven—Carbon black pigment. **Columbian Carbon Company**
R-B-H—Pigment dispersions. **R-B-H Dispersions**
R C Plasticizer E S—Polymeric plasticizer. **Rubber Corporation of America**
RD 910—Stabilizer-thickner. **Minnesota Mining & Manufacturing Company**
Readco—Mixers & materials handling equipment. **Read Standard Corporation**
RECO Brown—Concentrated brown iron oxides. **Reichard-Coulston, Inc.**
Red Diamond—Cylinder gas-CO_2. **Liquid Carbonic Corp.**
Red Giant—Hand lift truck. **Revolvator Co.**
Red Toner (Manganese) R-93—B.O.N. reds. **B. F. Goodrich Chemical Co.**
Repello—Water repellent. **Scher Bros.**
Resimene—Butylated melamine formaldehyde resins. **Monsanto Chemical Company**
Resimene-U—Butylated urea formaldehyde resins. **Monsanto Chemical Company**
Resinox P97—Phenolic resin. **Monsanto Chemical Company**
Resipel—Water repellent. **Scher Bros.**
Resyn—Polyvinyl acetate emulsions. **National Starch Products Inc.**
Resoflex—Plasticizers. **Cambridge Industries, Inc.**
Revolvator—Materials handling equipment. **Revolvator Company**
Rex Orange—Molybdate orange. **Imperial Paper & Color Corp.**
Reynolds Metals—Aluminum Powder & Paste. **Reynolds Metals Company**
Reynolized—Aluminum paste pigment. **Reynolds Metals Company**
Rezamul—Alkyd Emulsions. **Reichhold Chemicals, Inc.**
Rezyl—Oil & resin-modified alkyd resins. **American Cyanamid Company**
Rheotol—Surface active agent. **R. T. Vanderbilt Company**
Rhoplex—Acrylic resin dispersions. **Rohm & Haas Company**
Rhoplex AC-33—Acrylic emulsion. **Rohm & Haas Company**
Richmond Green Dispersion—Pigment green. **Ansbacher-Siegle Corp.**
Roalox—Grinding mill jars. **The U. S. Stoneware Co.**
Rocker-Roll—Drum mixers. **The U. S. Stoneware Co.**
Rodine—Pickling acid inhibitors. **American Chemical Paint Company**
Roller-Type—Laboratory mills. **The U. S. Stoneware Co.**
Roman—Manganese-BON pigment. **Kentucky Color Chemical Co.**
Rotator—Drum truck. **Morse Manufacturing Company, Inc.**
Rotocan—Change-can mixers. **Baker Perkins, Inc.**
Royal Spectra—Carbon blacks. **Columbian Carbon Co.**
Rubanox Red—Lithol Rubine. **The Sherwin-Williams Co.**
Rubbersol #3—Terpene solvent. **Newport Industries, Inc.**
Rubine Reds—Organic red pigments. **Imperial Paper & Color Corp.**
Rustib—Corrosion inhibitor. **Raybo Chemical Company**
RV—Flatting paste. **R-B-H Dispersions**

S

Safe-T-Hues—Special non-toxic colorants. **H. Kohnstamm & Company, Inc.**
Safflower 22—Isomerized safflower oil. **Pacific Vegetable Oil Corp.**
Saflex—Polyvinyl butyral. **Monsanto Chemical Company**
St. Joe—Lead-free zinc oxide. **St. Joseph Lead Company**
Santicizer—Chemical plasticizers. **Monsanto Chemical Company**
Santocel—Extender pigment, silica aerogel. **Monsanto Chemical Company**
Santolite—Aryl sulfonamide-formaldehyde resins. **Monsanto Chemical Company**
Sapona Reds—Soapfast reds. **Standard Ultramarine & Color Company**
Saran—Vinylidene Chloride polymers. **The Dow Chemical Company**
Sarkosyls—Emulsifiers and anti-corrosive agents. **Geigy Industrial Chemicals**
Schercolene—Dispersing agent. **Scher Bros.**
Sea Gull Brand—Ultramarine blue. **Reckitt's England**
Sealed-Disc—Paint filters. **Alsop Engineering Corporation**
Sequestrene—Metal complexing agent. **Geigy Industrial Chemicals**
Ser-X—Extender pigment; Sericite (hydrous aluminum silicate). **Innis, Speiden & Co., Inc.**
Shannon-Glow—Black light fluorescent products. **Shannon Luminous Materials Co.**
Shannon Line—Black light lamps. **Shannon Luminous Materials Co.**
Shear-flow—Mixers. **Gabb Special Products**
Shellmax—Micro crystalline waxes. **Shell Oil Company**
Shell Sol—Stoddard solvent. **Shell Oil Company**
Shell wax—Paraffin waxes. **Shell Oil Company**
Sher-Will-Glo—Fluorescent colors. **Sherwin-Williams Co.**
Ship Pitch—Pitch. **Newport Industries, Inc.**
Sierra Fibrene—Extender pigment; Talc (magnesium silicate). **Innis, Speiden & Co., Inc.**
Sierra Mistron—Extender pigment; Talc (magnesium silicate). **Innis, Speiden & Co., Inc.**
Sight-O-Matic—Paint mills. **J. M. Lehmann Co., Inc.**
Silastic—Silicone rubber. **Dow Corning Corp.**
Silex—Extender pigment; hard silica. **Innis, Speiden & Company, Inc.**
Silvar—Aluminum pastes & powders. **Silberline Mfg. Company, Inc.**
Silver Bond "B" Silica—Crystalline-hard silica. **Tamms Industries, Inc.**
Sinclair—Solvents. **Sinclair Chemicals Inc.**
Skelly solve—Aliphatic hydrocarbon solvents. **Skelly Oil Co.**
Skyline Blue—Phthalocyanine blues. **B. F. Goodrich Chemical Co.**
Smico—Process equipment. **Southwest Mill Industrial Equipment Company**
Smithko—Pigments and extenders. **Smith Chemical & Color Company**
Socal Petrolatum—Waxes. **Standard Oil Co. of California**
Socal Solvent—Aromatic Solvent. **Standard Oil Company of California**
Softex—Blue pigment. **Kentucky Color & Chemical Co.**
Softex Red—Precipitated pure red oxide. **Reichard-Coulston, Inc.**
Solarite—Hydrocarbon resin. **Solar Compounds Corp.**
Solfast—Lightfast organic red, phthalocyanine blue. **The Sherwin-Williams Co.**
Solinox—Process linseed oil. **Spencer Kellogg & Sons Inc.**
Solox—Solvent. **U. S. Industrial Chemicals Co.**
Solros—Heat-treated wood rosin. **Newport Industries, Inc.**
Soltrol—Odorless paint solvents & thinners. **Phillips Petroleum Company**
Solvenol—Mixed terpene solvent. **Hercules Powder Company**
Solvent #30—Terpene solvent. **Newport Industries, Inc.**
Solvesso—Aromatic petroleum solvents. **Esso Standard Oil Company**
Solvoflex—Gaskets. **The U. S. Stoneware Co.**
S-O-M—Sight-O-Matic control of roll pressures. **J. M. Lehmann Co., Inc.**
Sorbo—70% sorbitol solution. **Atlas Powder Co.**
Sovasol—Aliphatic petroleum solvents. **Socony-Vacuum Oil Company**
Soya Paint Oil—Modified soybean oil. **Pacific Vegetable Oil Corp.**
Soya Solinox—Process soybean oil. **Spencer Kellogg & Sons Inc.**
Soyalin—Specially processed soybean oil. **Brown-Allen Chemicals, Inc.**
Soyates—Soybean driers. **The Harshaw Chemical Company**
Soywood Oil—Co-polymerized combination of refined soybean oil and tung oil. **Pacific Vegetable Oil Corp.**
SP Alizarine Maroon MV-7013—Alizarine maroons. **B. F. Goodrich Chemical Co.**
Span—Emulsifiers; fatty acid esters of sorbitol anhydrides. **Atlas Powder Company**
Spangle—Aluminum paint improver. **Raybo Chemical Company**
Sparkler—Horizontal plate filters. **Sparkler Mfg. Co.**
Sparmite—Very fine barium sulfate. **C. K. Williams & Company**
Sparsol—Vinyl type polymer. **Sparta Industries**
SP Blue Toners BT-8—Tungstated blues and violet. **B. F. Goodrich Chemical Co.**
Spectronic 20—Colorimeter. **Bausch & Lomb Optical Company**
Speedee Mite—"Miniature paint factory in a test tube." **Charles E. Barker Company**
Spenkel—Polyurethane. **Spencer Kellog & Sons Inc.**
SR—Silicone resins. **General Electric Co.**
Stabelan—Vinyl stabilizers. **Harwick Standard Chemical Company**
Staybelite Ester—Glycerol ester of hydrogenated rosin. **Hercules Powder Company**
Stabilizer D-22—Dibutyl tin dilaurate. **Union Carbide Chemicals Company**
Stamford—Aluminum pastes & powders. **Silberline Mfg. Company, Inc.**
Standard—Zinc dust. **New Jersey Zinc Co.**
Standard Refined Wax—Waxes. **Standard Oil Company of California**
Standard Thinner—Aliphatic thinners. **Standard Oil Company of California**
Standardaire—Blower. **Read Standard Corp.**
Stardust—Magnesium silicate. **Tamms Industries, Inc.**
Statex—Carbon black pigment. **Columbian Carbon Company**
Steelco—Distilled tall oils. **K. A. Steel Chemicals Inc.**
Sterling—Oil and gas furnace and gas thermal carbon blacks. **Godfrey L. Cabot, Inc.**
Stern-Tite—Paint cans. **Stern Can Co., Inc.**
Steveco—Mixers, grinding equipment, tanks, fans, blowers. **The Stevenson Company**
Streako—Metallic Soaps. **W. H. Fales Co.**
Strypp-Away—Liquid paint stripper. **The Du-Bois Company, Inc.**
Stycast—Polystyrene casting resins. **Emerson & Cuming, Inc.**
Stypol—Polyester resins. **H. H. Robertson Co.**
Styresol—Styrenated alkyd resins. **Reichhold Chemicals, Inc.**
Styretex—Styrenated alkyd resins. **Jones-Dabney Company**
Styron—Polystyrene. **The Dow Chemical Co.**
Sunaptic—Naphthenic acids. **Sun Oil Co.**
Sunoco—Solvents. **Sun Oil Co.**
Sunolith—Lithopone. **The Glidden Company**
Sun Yellow—Nickel-titanium dioxide pigment. **The Harshaw Chemical Co.**
Super Ad-It—Fungicide. **Nuodex Products Company, Inc.**
Super Aetna Crimson red Oxide—Produced from crude Persian Gulf red oxide. **Reichard-Coulston, Inc.**
SuperEster Gum—Pentaerythritol ester of rosin. **Crosby Chemicals, Inc.**
Super Lacros—Maleic modified rosin esters (glycerol-type). **Crosby Chemicals, Inc.**
Superloid—Granular high viscosity ammonium alginate. **Kelco Co.**
Super Spectra—Carbon black pigment. **Columbian Carbon Company**
Super Three—Roller mills. **Kent Machine Works, Inc.**
Superba—Carbon black pigment. **Columbian Carbon Company**
Super-Beckacite—Pure phenolic resins. **Reichhold Chemicals, Inc.**
Super-Beckamine—Melamine-formaldehyde Resins. **Reichhold Chemicals, Inc.**
Super-Beckosol—Isophthalic Acid Alkyd Resins. **Reichhold Chemicals, Inc.**
Super IMperse—Aqueous pigment dispersions. **Imperial Paper & Color Corp.**
Supercarbovar—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Superflo—Linseed grinding oils. **Spencer Kellogg & Sons, Inc.**
Superfyde—Formaldehyde polymer. **Heyden Chemical Corporation**
Superior—Linseed varnish oils. **Spencer Kellogg & Sons, Inc.**
Superior—Soybean varnish oils. **Spencer Kellogg & Sons, Inc.**
Superjet—Lampblack. **C. K. Williams & Co.**
Superlin—Catalyzed refined linseed oil. **Brown-Allen Chemicals, Inc.**
Superoil—Low acid refined linseed oil. **Brown-Allen Chemicals, Inc.**
Super-sol—Odorless naphtha. **Pennsylvania Refining Company**
Supreme—Crushers, pulverizers. **Franklin P. Miller & Son, Inc.**
Suprex—Kaolin. **J. M. Huber Corp.**
Surfex—Calcium carbonate extender pigments. **Diamond Alkali Company**
Surfynol—Surface active agent, dispersant, liquid defoamer. **Air Reduction Chemical Co.**
Suspenso—Calcium carbonate extender pigments **Diamond Alkali Company**
Susperse B—Anti-sagging, anti-settling, wetting and dispersing agent. **Raybo Chemical Co.**
Swiveloader—Material handling equipment. **Stephens-Adamson Mfg. Company**
Syloid—Extender pigments; silica. **Davison Chemical Company**
Synco—Phenolic resins. **Snyder Chemical Corp.**
Synco 935-D—Cross-linking vinyl copolymer emulsion. **Snyder Chemical Corporation**
SynPar—Hard, high-melting wax. **H. L. Barnebey**
Syntex—Alkyd resins. **Jones-Dabney Company**
Synthaline Blue—Pure phthalo toner. **Whittaker, Clark & Daniels, Inc.**
Synthe-Copal—Ester gum resins. **Reichhold Chemicals, Inc.**
Synthemul—Alkyd emulsion. **Reichhold Chemicals, Inc.**
Synthenol—Dehydrated castor oil. **Spencer Kellogg & Sons, Inc.**
Syn-U-Tex—Butylated urea formaldehyde resins. **Jonse-Dabney Company**

Synvarite—100% phenolic resins. **Synvar Corp.**
Synvarol—Butylated urea resins. **Synvar Corp.**

T

T 1215—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**
T24-9—Vinyl alochol-acetate resin. **Bakelite Co.**
Tallene—Tall oil pitch. **West Virginia Pulp & Paper Co.**
Tartan Colors—Organic lakes and toners. **Magruder Color Co., Inc.**
Tasco—Talc. **Tamms Industries, Inc.**
T.A.T. Bentonite—Colloidal clay. **Tamms Industries, Inc.**
TBTO—Algicides, fungicides, milderwicides. **-etal & Thermit Corp.**
T. C.—Calcium carbonates. **Tamms Industries, Inc.**
Tecquinol—Technical hydroquinone. **Eastman Chemical Products, Inc.**
Tecsol—Proprietary solvent based on ethyl alcohol. **Eastman Chemical Products, Inc.**
Teflon—Tetrafluoroethylene resin. **E. I. du Pont de Nemours & Company**
Teglac—Rosin modified dibasic acid resins. **American Cyanamid Company**
Tenex—Heat-treated wood rosin. **Newport Industries, Inc.**
Tenn-Sil—Fillers. **Tennessee Products & Chemical Corp.**
Tergitol—Nonionic and anionic surface active agents. **Union Carbide Chemical Company**
Tetrahydrofuran—Solvent. **E. I. du Pont de Nemours & Co.**
Tetronic—Nonionic wetting agent and dispersant. **Wyandotte Chemicals Corp.**
Texaphor—Anti-setting agent. **Fallek Products Co.**
Texapon—Stabilizer and suspension agent. **Fallek Products Co.**
Texas—Pigment blacks. **Sid Richardson Carbon Co.**
Textile Spirits—An aliphatic naphtha having an evaporation range similar to benzol. **American Mineral Spirits Company**
T-Glo-8 & 8Y—Tall oil gloss oil. **Newport Industries, Inc.**
Thermatomic Black—Special purpose carbon black. **Thermatomic Carbon Co.**
Thermax, P-33—Carbon blacks. **R. T. Vanderbilt Company**
Thermoil-Granodine—Manganese iron phosphate coating chemicals for wear-proofing and rust-proofing. **American Chemical Paint Company**
Thermolite—Stabilizers for vinyls. **Metal & Thermit Corporation**
THFA—Tetrahydrofurfuryl alcohol. **The Quaker Oats Company**
Thixin—Multi-purpose paint additive. **Baker Castor Oil Co.**
Thoro Blender—Conical dry blender & mixer. **Patterson Foundry & Machine Company**
Ti-Cal—Titanium calcium pigments. **E. I. du Pont de Nemours & Company**
Tipen—Isophthalic tall oil alkyd. **Farac Oil & Chem. Co.**
Tints-All—Universal tinting colors. **Sheffield Bronze Paint Corp.**
Ti-Pure—Titanium dioxide pigments, rutile and anatase. **E. I. du Pont de Nemours & Co.**
Titanolith—Titanated lithopone. **The Glidden Company**
Titanox—Titanium dioxide pigments; rutile, anatase, non-pigmentary, titanium calcium. **Titanium Pigment Corporation**
TK—Flatting paste. **R-B-H Dispersions**
TME—Trimethylolethane. **Heyden Chemical Corporation**
TMP—Trimethylolpropane. **Heyden Chemical Corporation**
Tolbe—Tall oil pitch. **Newport Industries, Inc.**
Tolusol—Lacquer diluent. **Shell Oil Company**
Toxilic—Maleic acid. **National Aniline Division**
Toximul 250—Emulsifier. **Ninol Laboratories**
Transphalt—Asphaltic hydrocarbon resin. **Pennsylvania Industrial Chemical Corporation**
Transveyor—Compact, low-cost stacker. **Automatic Transportation Company**
Troykyd—Fungicides, puffing & bodying agents, anti-floating agents, anti-sagging agents, anti-settling agents, anti-skinning agents, wetting agents, dispersing agents. **Troy Chemical Co.**
Triangel—Carbon black. **United Carbon Co., Inc.**
Tribase—Stabilizers for vinyls. **National Lead Company**
Triclene—Trichlorethylene. **E. I. du Pont de Nemours & Company, Inc.**
Tri-Homo—Homogenizing machinery. **Tri-Homo Corporation**
Tripentek—Tripentaerythritol technical. **Heyden Chemical Corporation**
Triple Action—High speed colloid mills. **Troy Engine & Machine Co.**
Triton—Surface active agents. **Rohm & Haas Company**
Troluoil—Aliphatic petroleum thinner. **Anderson-Prichard Corporation**
Tulip—Tone colors. **Holland Color & Chemical Co.**
Tween—Emulsifiers; polyoxyethylene sorbitan fatty acid esters. **Atlas Powder Company**
Twitchell—Emulsifying agents. **Emery Industries, Inc.**
Ty-Bond—Zinc phosphate coating for metal. **Cowles Chemical Company**
Typhoon Agitator—Portable liquid mixer. **Patterson Foundry & Machine Company**

U

Ubatol—Modified polystyrene emulsion. **Union Bay State Chemical Co., Inc.**
Uformite—Urea formaldehyde and melamine-formaldehyde resins. **Rohm & Haas Company**
Ultrapole S—Amine condensate. **Ultra Chemical Works, Inc.**
Ultra-Turrax—Colloid Mills. **Cartrite International, Inc.**
Unapex—Latex paint base. **Naftone, Inc.**
Unimixers—Vertical liquid mixer. **Patterson Foundry & Machine Company**
Unipower—Agitator-mixer drive. **Patterson Foundry & Machine Company**
Unitane—Titanium dioxide pigment. **American Cyanamid Co.**
Unitol—Refined Tall Oil. **Union Bag & Paper Corporation**
Uplifter—Portable elevator. **Revolvator Co.**
U.S.I. Isosebacic Acid—Mixture of isomers of sebacic acid. **U. S. Industrial Chemicals Co.**
USS—Aromatic hydrocarbon solvents. **United States Steel Corporation**
USCO Resin—Oil-modified alkyd. **U. S. Coatings Co.**
USSCO—Ball mills. **The U. S. Stoneware Co.**
Utilitank—Glass lined storage tanks. **The Pfaudler Company**
Uversol—Driers. **The Harshaw Chemical Company**
Uvinul—Ultraviolet absorbers. **Antara Chemicals**

V

Vac Dry—Bleached shellac gum. **William Zinsser & Co., Inc.**
VAGH—Vinylchloride-acetate resins. **Bakelite Co.**
Vale Green—Chrome green pigment. **Imperial Paper & Color Corp.**
Vancide—Fungicides. **R. T. Vanderbilt Co.**
Vandor—Paint deodorant. **van Ameringen-Haebler, Inc.**
Varayd—Alkyds. **Farnow, Inc.**
Varez—Resin solutions. **McCloskey Varnish Co.**
Vari-Visco—Filling machine. **The Karl Kiefer Machine Co.**
Varkydols—Special drying oils. **McCloskey Varnish Company**
Varkyds—Alkyds, phthalic, non-phthalic and modified. **McCloskey Varnish Company**
Veegum—Magnesium aluminum silicate. **R. T. Vanderbilt Company**
Velsicol—Hydrocarbon resins and aromatic hydrocarbon solvents. **Velsicol Corporation**
Velvet Green—Chrome green pigment. **Imperial Paper & Color Corp.**
Velveteen "R" Silica—Amorphous silica. **Tamms Industries, Inc.**
Venus Natural Copper—Flake Copper Powder. **U. S. Bronze Powder Works, Inc.**
Venus Palegold—Gold bronze powder. **U. S. Bronze Powder Works, Inc.**
Vera Blanc—Water ground calcium carbonate. **DeLore Div., National Lead Co.**
Versamides—Polyamide resins. **General Mills, Inc.**
Vibrin—Polyester resins. **Naugatuck Chemical**
Vi-Cron—Very fine ground limestone. **C. K. Williams & Company**
Vinac—Polyvinyl acetate resins and emulsions. **The Colton Chemical Company**
Vinsol—Resin derived from southern pine wood. **Hercules Powder Company**
Vinsol Ester Gum—Glycerol ester of vinsol. **Hercules Powder Company**
Vinylite—Vinyl resins: acetate, chloride-acetate, chloride, alochol and butyral. **Bakelite Co.**
Vinymul—Polyvinyl acetate emulsion. **Morningstar-Paisley, Inc.**
Violite—Luminescent pigments. **Rhode Island Laboratories, Inc.**
Virginia Red Toners—Chlorinated lithol rubine. **Standard Ultramarine & Color Co.**
Viskoplus—Aluminum naphthenate. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Vistac—Rubber plasticizers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
VMCH—Vinyl chloride-acetate resins. **Bakelite Co.**
Voidox—Tertiary butylated phenol. **Guardian Chemical Corporation**
Vulcan—Steel shipping containers. **Vulcan Containers, Inc.**
VVF Pigments—Very fine natural iron oxides. **C. K. Williams & Company**
VYCM-1-2—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Bakelite Co.**
VYCM-3—Vinyl chloride-acetate resins. **Bakelite Co.**
Vygen—Polyvinyl chloride resin. **The General Tire & Rubber Company**
VYHH—Vinyl chloride-acetate resins. **Bakelite Co.**
VYLF—Vinyl chloride-acetate resins. **Bakelite Co.**
Vynite—Collapsible tubes for paint pigments. **Continental Can Company, Inc.**
VYNS—Vinyl chloride-acetate resins. **Bakelite Co.**
VYNV-1-2—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. Bakelite Co.
VYNW-5—Vinyl chloride-acetate resins. **Bakelite Co.**

W

Wallkyd—Alkyd resin vehicles. **Reichhold Chemicals, Inc.**
Wallpol—Plasticized vinyl acetate emulsion. **Reichhold Chemicals Inc.**
Walltax—Wall sizings. **Hayes Adhesives Co., Inc.**
Watchung—Permanent red 2B pigments. **E. I. du Pont de Nemours & Company**
WC-130—Polyvinyl acetate emulsion. **The Bakelite Company**
Weather-Ometer—Accelerated Weathering Machines. **Atlas Electric Devices Company**
Wetall—Wetting agent. **Scher Bros.**
Wet-Ege Spirits—Aliphatic hydrocarbon thinner **Anderson-Prichard Oil Corporation**
Wemco—Torque flow solids pump. **Western Machinery Company**
Witall—Tall oil driers. **Witco Chemical Co.**
Witcarb—Precipitated calcium carbonate. **Witco Chemical Company**
Witicizers—Plasticizers. **Witco Chemical Co.**
Witco—Paint driers, surface active agents, & stearates. **Witco Chemical Company**
Witcoblak—Furnace or channel blacks. **Witco Chemical Company**
Wittox—Copper & zinc naphthenates. **Witco Chemical Company**
Wonex—Soda-treated wood rosin. **Newport Industries, Inc.**

X Y Z

Xacto—Positive displace meter. **Bowser, Inc.**
XR-859, XR-875 Resins—Silicone — phenolic resins. **Dow Corning Corporation**
XX—**Lead-free zinc oxide.** New Jersey Zinc Co.
XYHL, XYSG—Vinyl butyral resins. **Bakelite Co.**

Yelkin—Lecithin—**Ross & Rowe, Inc.**

Zeco—Asphalts, stearine pitches, gilsonite. **G. S. Ziegler & Company**
Zeolex—Ultra fine silico aluminate. **J. M. Huber Corporation**
Zinar—Zinc resinate. **Newport Industries, Inc.**
Zinol—Zinc resinate solution. **Newport Industries, Inc.**
Zirco—Drier catalyst. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Zirex—Zinc resinate. **Newport Industries, Inc.**
Zitro—Zinc resinate. **Newport Industries, Inc.**
ZKU—Phenolic dispersions. **Bakelite Co.**
Zopaque—Titanium dioxide. **The Glidden Company**
Zulu—Phthalocyanine blue & green pigments. **Kentucky Color and Chemical Company**
Zytel—Nylon resin. **E. I. du Pont de Nemours & Company**

COMPANY DIRECTORY

A

Abbé Engineering Company
50 Church Street
New York 7, N. Y.
Paul O. Abbé, Inc.
Little Falls, N. J.
Acheson Colloids Company
Port Huron, Mich.
Acheson Dispersed Pigments Co.
2250 E. Ontario Street
Philadelphia 34, Pa.
Acme Shellac Products Co.
108 Blanchard Street
Newark 5, New Jersey
Adco Chemical Company
148 - 154 Rome Street
Newark 1, N. J.
Advance Solvents & Chemical
Div. of Carlisle Works, Inc.
New Brunswick, N. J.
Air Reduction Chemical Company
A Division of Air Reduction Company, Inc.
150 East 42nd Street
New York 17, N. Y.
Alkydol Laboratories, Inc.
3242 South Fiftieth Ave.
Cicero 50, Ill.
Allied Asphalt & Mineral Corporation
217 Broadway
New York 7, N. Y.
Allied Research Products, Inc.
4004-06 E. Monument Street
Baltimore 5, Md.
Amalgamated Chemical Corp.
Ontario & Rorer Streets
Philadelphia 34, Pa.
Aluminum Company of America
Alcoa Building
Pittsburgh 19, Pa.
C. M. Ambrose Company
9611 East Marginal Way
Seattle 8, Washington
American Alcolac Corporation
3440 Fairfield Road
Baltimore 26, Md.
American Alkyd Industries
Broad & 14th Street
Carlstadt, N. J.
American Can Company
100 Park Avenue
New York, N. Y.
American Chemical Paint Company
Ambler, Pa.
American Cyanamid Company
30 Rockefeller Plaza
New York 20, N. Y.
American Gilsonite Company
134 West Broadway
Salt Lake City, Utah
American Lecithin Company, Inc.
57 - 01 32nd Avenue
Woodside, L. I. 77, N. Y.
American Mineral Spirits Company
Mountain View
Murray Hill, N. J.
American Phosphors Co.
75 Esso Rd.
Bala-Cynwyd, Pa.
American Potash & Chemical Corp.
3030 West Sixth Street
Los Angeles 54, Calif.
American Zinc Sales Company
P. O. Box 327
Columbus 16, Ohio
Amoco Chemicals Corporation
910 S. Michigan Avenue
Chicago 80, Ill.
Anderson Chemical Co.
3940 Summit Street
Weston, Mich.
Anderson-Prichard Oil Corporation
Oklahoma City 2, Oklahoma
Ansbacher-Siegle Corporation
Rosebank, Staten Island, N. Y.
Ansul Chemical Company
Marinette, Wisconsin
Antara Chemicals
435 Hudson Street
New York 14, N. Y.
Apex Chemical Co., Inc.
200 S. First Street
Elizabethport 1, N. J.
Archer Daniels Midland Company
Investors Bldg.
Minneapolis 2, Minn.
Argus Chemical Corp.
633 Court Street
Brooklyn 31, N. Y.
Arizona Chemical Company
30 Rockefeller Plaza
New York 20, N. Y.
Armour Chemical Division
1355 West 31st Street
Chicago 9, Illinois
Aromatic Products Incorporated
235 Fourth Ave.
New York 16, N. Y.
The Atlantic Refining Company
260 S. Broad Street
Philadelphia 1, Pa.
Atlas Electric Devices Company
4114 N. Ravenswood Avenue
Chicago 13, Ill.
Atlas Powder Company
Wilmington 99, Delaware
Aula Chemicals, Inc.
P.O. Box 494
714 Division Street
Elizabeth, N. J.

B

Baird Associates, Inc.
33 University Road
Cambridge, Mass.
Baird Chemical Corporation
254 West 31st Street
New York 1, N. Y.
Bakelite Company
30 East 42nd Street
New York 17, N. Y.
Baker Caster Oil Co.
120 Broadway
New York 5, N. Y.
Baker Perkins Inc.
Saginaw, Michigan
Barber Asphalt Corp.
Barber, New Jersey
Bareco Oil Company
P.O. Box 2009
Tulsa, Oklahoma
Charles E. Barker Company
P.O. Box 85
Bladensburg, Maryland
Barksdale Company
921 Bergen Avenue
Jersey City 6, N. J.
H. L. Barnebey
P.O. Box 144
Pittsburgh 30, Pa.
Barrett-Cravens Company
630 Dundee Road
Northbrook, Illinois
Barrett Division
Allied Chemical & Dye Corp.
40 Rector Street
New York 6, N. Y.
Basic Varnish & Research Corp.
215 N. Tenth Street
Brooklyn 11, N. Y.
Bausch & Lomb Optical Co.
Rochester 2, N. Y.
Beacon Printing Company, Inc.
42 Marshall Street
Newark, N. J.
Beckman Instruments, Inc.
2500 Fullerton Road
Fullerton, Calif.
Beltran Associates, Inc.
1133 East 35th Street
Brooklyn 10, N. Y.
Bennett Industries, Inc.
Peotone, Ill.
Berncolors, Inc.
Poughkeepsie, N. Y.
Bethlehem Foundry & Machine Company
Bethlehem, Penna.
Blach Industries, Inc.
10 Indian Spring Road
Cranford, N. J.
Binks Manufacturing Company
3114 W. Carroll Ave.
Chicago 12, Illinois
Blackmer Pump Company
1809 Century SW
Grand Rapids 9, Mich.
Blaw-Knox Company
Blaw Ave.
Blaw Knox, Pa.
The Borden Company
Chemical Div.
350 Madison Avenue
New York 17, N. Y.
The Borden Company
Chemical Div.
Monomer Dept.
350 Madison Ave.
New York 17, N. Y.
The Borden Company
Chemical Div.
Polyco Dept.
350 Madison Ave.
New York 17, N. Y.
The Borden Company
Chemical Div.
Resinous-Reslac Dept.
350 Madison Ave.
New York 17, N. Y.
Bowser, Inc.
Fort Wayne 2, Indiana
W. H. Brady Company
727 West Glendale Avenue
Milwaukee 12, Wis.
Brazil Oiticica
80 Broad Street
New York 4, N. Y.
Brazilian Industrial Oils
75 West St.
New York, N. Y.
Brighton Copper Works, Inc.
820 State Ave.
Cincinnati, Ohio
Brookfield Engineering Laboratories, Inc.
250 Cushing Street
Stoughton, Mass.
The R. J. Brown Company
1418 Wittenberg Avenue
St. Louis 10, Mo.
Brown-Allen Chemicals, Inc.
Box 1, Port Richmond
Staten Island 2, N. Y.
The Buckeye Cotton Oil Company
Memphis 8, Tenn.
Buckman Laboratories, Inc.
Memphis 8, Tenn.
Buflovak Equipment Div.
Buffalo 11, N. Y.
E. D. Bullard Company
275 Eighth Street
San Francisco 3, Calif.
Burdett Manufacturing Company
3433 West Madison Street
Chicago 24, Illinois
Burrell Corp.
2223 Fifth Ave.
Pittsburgh, Pa.
Burt Machine Company
Baltimore 2, Md.
The Burtonite Co.
Nutley 10, N. J.

C

Godfrey L. Cabot, Inc.
77 Franklin Street
Boston 10, Massachusetts
The California Ink Company, Inc.
545 Sansome Street
San Francisco, Calif.
John H. Calo Company, Inc.*
19 Rector Street
New York 6, N. Y.
*Representing:
Hercules Powder Co.
Reynolds Metal Co.
Neville Chemical Co.
Naftone Inc.
Minnesota Linseed Oil Co.
General Tire & Rubber Co.
Union Bag-Camp Paper Corp.
Hammond Lead Products, Inc.

Calvert-Mount Winans Co.
Annapolis Ave.
B & O Railroad
Westport-Baltimore 30, Md.
Cambridge Industries Company, Inc.
101 Potter Street
Cambridge 42, Mass.
Carbola Chemical Co.
Natural Bridge, N. Y.
Carbon Dispersions, Inc.
27 Haynes Avenue
Newark 5, N. J.
Cargill, Inc.
Veg. Oil Div.
Flour Exchange Bldg.
Minneapolis 15, Minn.
The Carwin Company
North Haven, Conn.
Catalytic Combustion Corp.
4544 Grand River Avenue
Detroit 8, Mich.
Celanese Corp. of America
Chemical Div.
180 Madison Ave.
New York 16, N. Y.
Celanese Corp. of America
Plastics Div.
290 Ferry Street
Newark 5, N. J.
Cellofilm Industries, Inc.
Union Avenue
Woodridge, N. J.
Central Solvents & Chemicals Company
2545 West Congress Street
Chicago 12, Illinois
Central Soya Co., Inc.
Fort Wayne, Ind.
Chemical and Pharmaceutical Industry Co., Inc.
90 West Broadway
New York 7, N. Y.
Chemical Prods. Corp.
P.O. Box 61
Little Falls, N. J.
Chemical Solvents, Inc.
60 Park Place
Newark 2, N. J.
Chemicolloid Laboratories Inc.
30 Church Street
New York 7, N. Y.
Chisholm-Ryder Company of Pennsylvania
Hanover, Pennsylvania
Ciba Company, Inc.
260 Madison Ave.
New York, N. Y.
Cincinnati Hildebrand Co.
3410 Beekman St.
Cincinnati, Ohio
Claremont Pigment Dispersion Corp.
39 Powerhouse Rd.
Roslyn Hts., L. I., N. Y.
Clark Equipment Company
Battle Creek, Mich.
Cleveland Aerosol Packaging Corp.
Division of Plasti-Kote, Inc.
9801 Harvard Avenue
Cleveland, Ohio
The Cleveland Steel Barrel Company
9612 Meech Avenue
Cleveland 5, Ohio
Climax Molybdenum Co.
500 Fifth Avenue
New York 36, N. Y.
Collway Colors Incorporated
15 Market Street
Paterson, N. J.
The Colton Chemical Company
1747 Chester Ave.
Cleveland, Ohio
Columbia-Southern Chemical Corp.
Subsidiary of Pittsburgh Plate Glass Company
2 Gateway Center
Pittsburgh 22, Pa.
Columbian Carbon Company
380 Madison Ave.
New York, N. Y.
Colwell Color Cards
501 S. Sixth Street
Minneapolis, Minn.
Combustion Engineering, Inc.
1315 N. Branch Street
Chicago 22, Illinois
Commercial Solvents Corporation
260 Madison Avenue
New York 16, N. Y.
Conforming Matrix Corp.
Toledo Factories Bldg.
Toledo 2, Ohio
Concord Mica Corp.
35 Crescent Street
Penacook, N. H.
Continental Can Company, Inc.
100 East 42nd Street
New York 17, N. Y.
Continental Carbon Co.
122 E. 42nd Street
New York 17, N. Y.
Continental Oil Company
P.O. Box 2197
Houston 1, Texas
Corn Products Sales Co.
17 Battery Place
New York 4, N. Y.
Corrosion Control Co., Inc.
516 Fifth Avenue
New York 36, N. Y.
Cosden Petroleum Corporation
P.O. Box 1311
Big Spring, Texas
Cowles Chemical Company
7016 Euclid Ave.
Cleveland 3, Ohio
Crosby Chemicals, Inc.
Box 111
Picayune, Miss.
Crown Can Div.
Crown Cork & Seal Co.
H St. & Erie Ave.
Philadelphia, Pa.
Crown Engineering & Sales Co.
421 Hill Street
Harrison, N. J.
Crownoil Chemical Co., Inc.
2-14 49th Avenue
Long Island City 1, N. Y.
The Cuno Engineering Corporation
Meriden, Connecticut
Cuprinol Division
Darworth Incorporated
Simsbury, Conn.

D

The Davies Can Company
8007 Grand Ave.
Cleveland 4, Ohio
The Davison Chemical Company
Baltimore 3, Maryland
The J. H. Day Company, Inc.
Div. Cleveland Automatic Machine Co.
Cincinnati 22, Ohio
Delaware Chemicals, Inc.
P.O. Box 1772
Wilmington, Del.
Detrex Corporation
Box 501
Detroit 32, Michigan
The DeVilbiss Company
Toledo 1, Ohio
Dewey & Almy Chemical Co.
Cambridge 40, Mass.
Diamond Alkali Company
300 Union Commerce Building
Cleveland 14, Ohio
Distillation Products Industries
Rochester 3, N. Y.
Dixie Pine Products
P.O. Drawer
Hattiesburg, Miss.
Dodge & Olcott, Inc.
180 Varick Street
New York 14, N. Y.
The Dow Chemical Company
Midland, Mich.
Dow Corning Corp.
Midland, Mich.
Doyle Vacuum Cleaner Co.
242 Stevens St. S. W.
Grand Rapids 2, Mich.
Drage Products
406 32nd Street
Union City, N. J.
E. F. Drew & Co., Inc.
15 East 26th Street
New York 10, N. Y.
Dri-Flo Mfg. Company
642 East Ten Mile Road
Hazel Park, Mich.
The DuBois Co. Inc.
Cincinnati 3, Ohio
E. I. duPont de Nemours & Company
Electrochemicals Dept.
Pigments-Color
White
Wilmington 98, Del.
Dura Commodities Corporation
20 Vesey Street
New York 7, N. Y.
Durez Plastics & Chemicals, Inc.
North Tonawanda, New York

E

The Eagle-Picher Company
American Building
Cincinnati 1, Ohio
J. S. & W. E. Eakins, Inc.
55 Berry St.
Brooklyn, N. Y.
Eastern Industries, Inc.
Mixer Division
East Norwalk, Connecticut
Eastern States Chemical Corporation
8938 Manchester Avenue
Houston 12, Texas
Eastman Chemical Products, Inc.
Kingsport, Tennessee
Denton Edwards, Ltd.
42 Broadway
New York, N. Y.
El Dorado Oil Works
Foremost Food & Chemical Co.
Ft. of Adeline St.
Oakland, Calif.
The Elwell-Parker Electric Company
50 Church Street
New York 7, N. Y.
Emerson & Cuming, Inc.
869 Washington Street
Canton, Mass.
Emery Industries, Inc.
Carew Tower
Cincinnati 2, Ohio
The Emulsol Corporation
59 East Madison Street
Chicago 3, Illinois
The English Mica Company
79 Prospect Street
Stamford, Conn.
Enjay Company, Inc.
15 West 51st Street
New York 19, N. Y.
Enthone Incorporated
442 Elm Street
New Haven, Conn.
Epworth Manufacturing Company
8809 Epworth Boulevard
Detroit 4, Mich.
Esso Standard Oil Company
15 West 51st Street
New York 19, N. Y.

F

The W. H. Fales Company
609 Clinton Street
Brooklyn 31, N. Y.
Fallek Products Company, Inc.
165 Broadway
New York 6, N. Y.
Farac Oil and Chemical Company
145th Street and Indiana Avenue
Chicago 27, Ill.
Farnow, Inc.
4-80 47th Road
Long Island City 1, N. Y.
Federal Color Laboratories, Inc.
4630 Forest Avenue
Norwood, Cincinnati 12, Ohio
Federal Latex Corporation
210-220 Wythe Avenue
Brooklyn 11, N. Y.
Fein's Tin Can Co., Inc.
50th Street & 1st Ave.
Brooklyn, N. Y.
Ferro Corporation
4150 East 56th Street
Cleveland 5, Ohio
Filpaco Industries, Inc.
2463 South Michigan Avenue
Chicago 16, Ill.
Filtered Rosin Products, Inc.
P.O. Box 179
Baxley, Ga.
Fine Organics, Incorporated
211 East 19th Street
New York 3, N. Y.
Finish Engineering Co., Inc.
115 Cherry Street
Erie, Pa.
Firestone Plastics Company
P.O. Box 690
Pottstown, Pa.
Fisher Scientific Company
717 Forbes Street
Pittsburgh 19, Pa.
Foster Pump Works, Inc.
50 Washington Street
Brooklyn, N. Y.
The Fostoria Pressed Steel Corporation
Fostoria, Ohio
France, Campbell & Darling, Inc.
Kenilworth, N. J.
Franklin Mineral Products Company
Franklin, North Carolina
Freeman Chemical Corporation
211 East Main Street
Port Washington, Wisconsin
Fritzsche Brothers, Inc.
76 Ninth Avenue
New York 11, N. Y.
Furane Plastics, Inc.
4516 Brazil Street
Los Angeles 39, Calif.

G

Gallowhur Chemical Corporation
N. Water St.
Ossining, N. Y.
Gardner Laboratory Inc.
4723 Elm Street
Bethesda 14, Md.
Geigy Industrial Chemicals
Saw Mill River Road
Ardsley, N. Y.
General Aniline & Film Corporation
435 Hudson St.
New York 14, N. Y.
General Carbon Company
7542 Maie Ave.
Los Angeles 1, Calif.
General Color Company
24 Avenue B
Newark 5, N. J.
General Dyestuff Corporation
435 Hudson Street
New York 14, N. Y.

General Electric Company
Chemical Materials Dept.
77 River Rd.
Schenectady, N. Y.
General Latex & Chemical Corp.
666 Main Street
Cambridge 39, Mass.
General Mills, Inc.
Chemical Division
400 Second Ave., S.
Minneapolis, Minn.
General Printing Corp.
Ft. Wayne Ind.
The General Tire & Rubber Co.
Chemical Division
Akron, Ohio
Georgia Kaolin Co.
433 N. Broad St.
Elizabeth, N. J.
The Georgia Marble Co.
Calcium Products Div.
Tate, Ga.
Geuder Paeschke & Frey Co.
324 N. 15th St.
Milwaukee 1, Wisconsin
Gifford Wood Co.
420 Lexington Avenue
New York 17, N. Y.
Gillespie-Rogers-Pyatt Co. Inc.
75 West Street
New York 6, N. Y.
Givaudan-Delawanna, Inc.
330 West 42nd Street
New York 36, N. Y.
The Glidden Company
Chemicals-Pigments-Metals Division
1396 Union Commerce Building
Cleveland 14, Ohio
The Glidden Company
Naval Stores Division
P.O. Box 389
Jacksonville 1, Florida
Glycerine Corp. of America
36 W. 44 St.
New York, N. Y.
Glyco Products Co., Inc.
Empire State Bldg.
New York 1, N. Y.
B. F. Goodrich Chemical Co.
3135 Euclid Ave.
Cleveland, Ohio
The Goodyear Tire & Rubber Co.
Chemical Division
Akron 16, Ohio
Carl Gorr Color Card, Inc.
3837 W. Roosevelt Road
Chicago 24, Ill.
Goulds Pumps, Inc.
Seneca Falls, N. Y.
Grace Chemical Company
Division of W. R. Grace & Co.
Edway Bldg.
Memphis 3, Tenn.
Great Lakes Carbon Corporation
Dicalite Div.
612 South Flower Street
Los Angeles 17, Calif.
The Greif Bros. Cooperage Corporation
Cleveland 13, Ohio
The Emil Greiner Company
20-26 N. Moore Street
New York 13, N. Y.
The Griffith Laboratories
1415 W. 37th Street
Chicago 9, Ill.
A. Gross & Co.
295 Madison Ave.
New York 17, N. Y.
Guardian Chemical Corp.
10-15 43rd Avenue
Long Island City 1, N. Y.
Gulf Oil Corporation
17 Battery Place
New York 4, N. Y.

H

Haeuser Shellac Co., Inc.
52 Warren Street
Brooklyn, N. Y.
Harchem Division
Wallace & Tiernan, Inc.
Box 178
Newark 1, N. J.
Charles J. Hardy, Inc.
420 Lexington Ave.
New York, N. Y.
The Harshaw Chemical Co.
1945 East 97th Street
Cleveland 6, Ohio
Harshaw Scientific Division
1945 E. 97th Street
Cleveland 6, Ohio
Harwick Standard Chemical Company
60 South Seiberling Street
Akron 5, Ohio
Hayden Mica Company
Wilmington, Massachusetts
Hayes Adhesives Co., Inc.
630 W. 51st Street
New York 19, N. Y.
Hellige, Inc.
Garden City, N. Y.
Hercules Powder Company
Wilmington 99, Delaware
Herman Hockmeyer & Co.
341 Coster Street
New York 59, N. Y.
Heyden Chemical Corporation
342 Madison Avenue
New York 17, N. Y.
Hilton-Davis Chemical Co.
Division of Sterling Drug, Inc.
2235 Langdon Farm Road
Cincinnati 13, Ohio
Hinde & Dauch
Sandusky, Ohio
Holland Colors & Chemical Company
Holland, Michigan
Hooker Electrochemical Company
Niagara Falls, N. Y.
Hoover Color Corp.
13 Cordier Street
Irvington 11, N. J.
Hope Machine Co.
9400 State Road
Philadelphia, Pa.
The Hopkins Company
150 Nassau Street
New York 38, N. Y.
Howards & Sons (Canada) Ltd.
247 Dunbar Avenue
Montreal, Quebec
J. M. Huber Corporation
100 Park Avenue
New York 17, N. Y.
Humphrey-Wilkinson, Inc.
North Haven, Conn.
Hyster Co.
2905 N. E. Clackamas Street
Portland 8, Ore.

I

Imperial Paper and Color Corporation
Glen Falls, N. Y.
Indoil Chemical Company
910 South Michigan Avenue
Chicago 80, Ill.
Industrial Filter & Pump Mfg. Co.
5900 Ogden Avenue
Chicago 50, Illinois
Inland Steel Container Co.
38 South Dearborn Street
Chicago 3, Ill.
O. G Innes Corporation
82 Wall Street
New York 5, N. Y.
Innes, Speiden & Co. Inc.
420 Lexington Avenue
New York 17, N. Y.
Interchemical Corporation
67 W. 44th St.
New York, N. Y.
Internatio-Rotterdam, Inc.
10 Hanover Square
New York 5, N. Y.
International Engineering Inc.
Dayton 1, Ohio
Isocyanate Products, Inc.
P.O. Box 1681
Wilmington, Delaware

J

Jefferson Chemical Company Inc.
260 Madison Ave.
New York 16, N. Y.
Jersey State Chemical Co.
59 Lee Ave.
Haledon, N. J.
Johns-Manville
22 East 40th Street
New York 16, N. Y.
Jones & Laughlin Steel Corporation
3 Gateway Center
Pittsburgh 30, Pa.
Jones-Dabney Company
Louisville, Ky.

K

Kay-Fries Chemicals, Inc.
180 Madison Avenue
New York 16, N. Y.
Kelco Company
120 Broadway
New York 5, N. Y.
The M. W. Kellogg Company
Jersey City 3, N. J.
Spencer Kellogg and Sons, Inc.
Buffalo 5, N. Y.
The C. M. Kemp Mfg. Co.
405 East Oliver Street
Baltimore 2, Md.
Kent Machine Works, Inc.
37-39-41 Gold Street
Brooklyn 1, N. Y.
Kentucky Color and Chemical Co.
600 North 34th Street
Louisville 12, Ky.
Key Chemicals Corp.
P.O. Box 692
Miami Springs, Fla.
Walter Kidde & Co., Inc.
Belleville 9, N. J.
The Karl Keifer Machine Company
Cincinnati 2, Ohio
Kinetic Dispersion Corporation
95 Botsford Place
Buffalo 16, N. Y.
H. Kohnstamm & Co., Inc.
83-93 Park Pl.
New York 7, N. Y.
Kolker Chemical Works, Inc.
80 Lister Avenue
Newark 5, N. J.
Koppers Company, Inc.
Chemical Division
Pittsburgh 19, Pa.
Kraft Chemical Company, Inc.
917 West 18th Street
Chicago 8, Illinois
Kromall Chemical & Dispersions Corp.
10-12 46th Avenue
Long Island City 1, N. Y.
Krumbhaar Chemicals, Inc.
24-30 Jacobus Avenue
South Kearny, N. J.

L

Leeds & Northrup Company
4907 Stenton Avenue
Philadelphia 44, Pa.
J. M. Lehmann Company, Inc.
550 New York Avenue
Lyndhurst, N. J.
Linde Air Products Company
30 E. 42nd Street
New York 17, N. Y.
Liquid Carbonic Corp.
3100 S. Kedzie Ave.
Chicago 23, Ill.
LZP Industrial Ceramics Co.
275 Kalamath Street
Denver 23, Colorado

M

Macbeth Corp. & Subsidiaries
Newburgh, N. Y.
Machinery & Equipment Co.
514 Bryant Street
San Francisco, Calif.
Magna Manufacturing Co., Inc.
Haskell, New Jersey
Magruder Color Company, Inc.
2385 Richmond Terrace
Staten Island 2, N. Y.
Mallinckrodt Chemical Works
Second & Mallinckrodt Sts.
St. Louis 7, Mo.
Manton-Gaulin Manufacturing Co., Inc.
44 Garden Street
Everett 49, Massachusetts
Marathon Corporation
Chemical Division
Rothschild, Wis.
The Marblette Corporation
37-21 30th Street
Long Island City 1, N. Y.
Marbon Chemical Division
Borg-Warner Corp.
1926 West Tenth Avenue
Gary, Indiana
Marco Company, Inc.
Third & Church Streets
Wilmington 50, Del.
Market Forge Company
Everett 49, Mass.
Marlow Pumps
Box 566
Ridgewood, N. J.
Matherson-Selig Co.
1815 North Central Park Avenue
Chicago, Illinois
T. F. McAdam
26 Broadway
New York, N.. Y.
McCloskey Varnish Co.
Philadelphia 36, Pa.
McDanel Refractory Porcelain Co.
Beaver Falls, Pennsylvania
The McGeon Chemical Co.
1040 Midland Bldg.
Cleveland 15, Ohio
The Mead Corporation
Chillicothe, Ohio
Mearl Corp.
153 A Waverly Place
New York 14, N. Y.
Merck & Co., Inc.
Chemical Division
Rahway, N. J.
Metal & Thermit Corporation
100 East 42nd Street
New York 17, N. Y.
Metalead Products Corporation
2901 Park Blvd.
Palo Alto, Calif.
Metals Disintegrating Company, Inc.
Elizabeth (B), New Jersey
Metalsalts Corporation
200 Wagaraw Road
Hawthorne, N. J.

Metasap Chemical Company
Harrison, N. J.
Franklin P. Miller & Sons, Inc.
36 Meadow Street
East Orange 13, N. J.
Mine Safety Appliances Company
201 N. Braddock Avenue
Pittsburgh 8, Pa.
Mineral Pigments Corporation
Muirkirk, Maryland
Mineralite Sales Corporation
90 Pine Street
New York 5, N. Y.
Minerals & Chemicals Corporation of America
Menlo Park, N. J.
Minnesota Linseed Oil Company
1101 So. Third St.
Minneapolis, Minn.
Minnesota Mining & Manufacturing Co.
900 Fauquier Avenue
St. Paul 6, Minnesota
The Miskella Infra-red Company
East 73rd and Grand Avenue
Cleveland 4, Ohio
Mixing Equipment Co., Inc.
135 Mt. Read Boulevard
Rochester 11, N. Y.
Mobay Chemical Company
St Louis 4, Missouri
Mona Industries Inc.
Paterson 4, N. J.
Monsanto Chemical Co.
Plastics Division
Springfield, Mass.
Monsanto Chemical Company
St. Louis, Mo.
Mooney Chemicals, Inc.
2271 Scranton Road
Cleveland 13, Ohio
John B. Moore Corporation
Nutley 10, N. J.
Morehouse-Cowles, Inc.
1156 San Fernando Road
Los Angeles 65, Calif.
Morest Co.
211 Center St.
New York, N. Y.
Morningstar-Paisley Inc.
630 West 51st Street
New York 19, N. Y.
Mutual Chemical Co. of America
Block & Willis Sts.
Baltimore 31, Md.

N

Naftone, Inc.
515 Madison Avenue
New York 22, N. Y.
National Aniline Division
Allied Chemical & Dye Corp.
40 Rector Street
New York 6, N. Y.
National Can Corp.
3217 W. 47th Place
Chicago 47, Ill.
National Equipment Corporation
153-7 Crosby Street
New York 12, N. Y.
National Foam System, Inc.
W. Chester, Pa.
National Lead Company
DeLore Division
111 Broadway
New York 6, N. Y.
National Polychemicals, Inc.
Eames Street
Wilmington, Mass.
National Rosin Oil Products, Inc.
1270 Avenue of the Americas
New York 20, N. Y.
National Starch Prods., Inc.
270 Madison Avenue
New York 16, N. Y.
National Steel Container Corp.
6700 S. Leclaire Avenue
Chicago 38, Ill.
National Wax Company
1300 West Division Street
Chicago 22, Illinois
Naugatuck Chemical
Naugutuck, Conn.
Neilson Chemical Company
6564 Benson Street
Detroit 7, Mich.
Neville Chemical Company
Neville Island
Pittsburgh 25, Pa.
The New Jersey Zinc Company
160 Front Street
New York 38, N. Y.
Newport Industries, Inc.
230 Park Ave.
New York 17, N. Y.
Ninol Laboratories
1719 South Clinton Street
Chicago 16, Ill.
Nitrogen Division
Allied Chemical & Dye Corp.
40 Rector Street
New York 6, N. Y.
Nopco Chemical Co., Inc.
Harrison, N. J.
Norcross Corp.
Newton 58, Mass.
Nova Chemical Corporation
147-153 Waverly Place
New York 14, N. Y.
Nuodex Products Co., Inc.
Elizabeth, N. J.

O

Oakite Products, Inc.
19 Rector Street
New York 6, N. Y.
Ohio-Apex Division
Food Machinery & Chemical Corp.
Nitro, West Virginia
Olin Mathieson Chemical Corp.
Mathieson Bldg.
Baltimore 3, Md.
Onyx Oil & Chemical Company
Warren & Morris Sts.
Jersey City 2, N. J.
Oronite Chemical Company
200 Bush St.
San Francisco, Calif.
C. J. Osborn Company
132 Nassau Street
New York 7, N. Y.

P

Pacific Vegetable Oil Corp.
62 Townsend St.
San Francisco, Calif.
Pan American Chemical Div.
122 East 42nd Street
New York 17, N. Y.
Parker Rust Proof Company
Detroit 11, Mich.
M. W. Parsons-Plymouth, Inc.
55 Beekman St.
New York 38, N. Y.
The Patterson Foundry & Machine Company
East Liverpool, Ohio
The Patterson-Kelly Co. Inc.,
Warren Street
East Stroudsburg, Pa.
Peerless Color Company, Inc.
521-535 North Avenue
Plainfield, N. J.
Pelron Corp.
7740 W. 47th Street
Lyons, Illinois
The Pennebacker Company
Emmaus, Pennsylvania
Pennsylvania Color & Chemical Co.
Pine Run Road
Doylestown, Pa.
Penn. Ind. Chem. Corp.
Clairton, Pa.
Pennsylvania Refining Company
Butler, Pa.
Pennsylvania Salt Manufacturing Co.
1000 Widener Bldg.
Philadelphia 7, Pa.
Penola Oil Company
15 West 51st Street
New York 19, N. Y.
The Perkin-Elmer Corporation
Norwalk, Connecticut
Petrochemicals Company
1825 E. Spring Street
Long Beach 6, Calif.
Petroleum Specialties Company
4030 Chouteau Avenue
St. Louis 10, Missouri
Petrolite Corp., Ltd.
30 Broad Street
New York 4, N. Y.
Petrometer Corporation
43-22 Tenth Street
Long Island City 1, N. Y.
The Pfaudler Co.
1000 West Avenue
Rochester 3, N. Y.
Pfister Chemical Wks.
Ridgefield, N. J.
Chas. Pfizer & Co., Inc.
630 Flushing Avenue
Brooklyn 6, N. Y.
Phillips Petroleum Company
Special Products Division
Bartlesville, Oklahoma
Photovolt Corp.
95 Madison Ave.
New York 16, N. Y.
Pioneer Latex & Chemical Co.
Middlesex, N. J.
Pittsburgh Coke and Chemical Company
Grant Building
Pittsburgh 19, Pa.
Plaskon
Barrett Div.
Allied Chemicals & Dye Corp.
40 Rector St.
New York, N. Y.
Polak's Frutal Works, Inc.
33 Sprague Avenue
Middletown, N. Y.
Potters Brothers, Inc.
Carlstadt, N. J.
Precision Scientific Co.
3737 W. Cortland Street
Chicago, Ill.
Pressed Steel Tank Company
West Allis Station
Milwaukee, Wis.
Price Varnish Co.
3rd & St. Louis
Valley Park, Mo.
Process Eng. & Mach. Company
Elizabeth, N. J.
Procter & Gamble
Cincinnati 1, Ohio
The Protectoseal Company
1920 South Western Avenue
Chicago 8, Illinois
Publicker Industries, Inc.
1429 Walnut Street
Philadelphia 2, Pa.
Pulverizing Machinery Company
Chatham Road
Summit, N. J.
Pyrene-C-O-Two
P.O. Box 390
Newark 1, N. J.

Q

The Quaker Oats Company
Merchandise Mart Plaza
Chicago 54, Illinois

R

Ransburg Electro-Coating Corp.
Barth & Saunders Sts.
Indianapolis 7, Indiana
The Rapids-Standard Company, Inc.
Rapistan Bldg.
Grand Rapids 2, Mich.
Raybo Chemical Company
Huntington, West Virginia
R-B-H Dispersions
Interchemical Corp.
Bound Brook, New Jersey
Read Standard Corporation
Bakery Chemical Division
York, Pa.
Reichard-Coulston, Inc.
15 East 26th Street
New York 10, N. Y.
Reichhold Chemicals, Inc.
525 North Broadway
White Plains, N. Y.
Reilly Tar & Chemical Corporation
Merchants Bank Bldg.
Indianapolis 4, Indiana
Revolvator Company
North Bergen, N. J.
Reynolds Metals Company
Richmond, Virginia
Rheem Manufacturing Company
4361 Firestone Blvd.
South Gate, Calif.
Rhode Island Laboratories, Inc.
West Warwick, R. I.
Rhodia, Inc.
230 Park Avenue
New York 17, N. Y.
Sid Richardson Carbon Company
Fort Worth Club Bldg.
Fort Worth, Texas
W. C. Ritchie & Company
8802 Baltimore Avenue
Chicago 17, Ill.
H. H. Robertson Company
Pittsburgh, Pa.
Rockwell Manufacturing Co.
Pittsburgh 8, Pa.
Rohm & Haas Company
Washington Square
Philadelphia 5, Pa.
Charles Ross & Son Company
148-156 Classon Avenue
Brooklyn 5, N. Y.
Frank B. Ross Co., Inc.
Jersey City 4, N. J.
Ross & Rowe
50 Church St.
New York 4, N. Y.
Milton Roy Company
75 West Street
New York 6, N. Y.

S

St. Joseph Lead Company
250 Park Avenue
New York 17, N. Y.
Sandoz, Inc.
Pigment Division
61-63 Van Dam Street
New York 13, N. Y.
Schenectady Varnish Co.
200 Congress Street
Schenectady 1, N. Y.
Claude B. Schneible Company
P.O. Box 81, North End Station
Detroit 2, Michigan
Scher Bros.
Styertowne Road
Clifton, N. J.
Schutte and Koerting Company
Cornwells Heights
Bucks County, Pa.
Schutz-O'Neill Company
307 Portland Avenue
Minneapolis 15, Minn.
Scientific Oil Compounding Co., Inc.
1637 South Kilbourn Avenue
Chicago 23, Ill.

Selas Corp. of America
Dresher, Pa.
Semet-Solvay Petrochemical Division
Allied Chemical & Dye Corp.
40 Rector Street
New York 6, N. Y.
George Senn, Inc.
2200 E. Westmoreland Street
Philadelphia 34, Pa.
Sharples Chemicals Inc.
1100 Widener Bldg.
Philadelphia 7, Pa.
Shawinigan Resins Corp.
P.O. Box 2130
Springfield 2, Mass.
Sheffield Bronze Paint Corp.
17814 Waterloo Road
Cleveland 19, Ohio
Shell Chemical Corporation
380 Madison Avenue
New York 17, N. Y.
Shell Oil Company
50 W. 50th St.
New York 20, N. Y.
The Shepherd Chemical Co.
2803 Highland Avenue
Cincinnati 12, Ohio
Sherwin-Williams Company
115th Street & Cottage Grove Avenue
Chicago 28, Ill.
Silberline Mfg. Co., Inc.
Stamford, Conn.
Sinclair Chemicals, Inc.
6 East 45th Street
New York 17, N. Y.
Sindar Corporation
330 West 42nd Street
New York 36, N. Y.
Skelly Oil Company
605 West 47th Street
Kansas City 41, Missouri
Smico Inc.
25 N. E. 26th
Oklahoma City, Okla.
Smith Chemical & Color Co.
55 John Street
Brooklyn 1, N. Y.
J. Lee Smith & Co.
22 Ann Street
New York 38, N. Y.
Werner G. Smith, Inc.
1730 Train Avenue
Cleveland 13, Ohio
Snyder Chemical Corporation
Bethel, Connecticut
Socony Mobil Oil Co.
150 E. 42nd St.
New York, N. Y.
Solar Compounds Corp.
Linden, N. J.
Solvay Process Division
Allied Chemical & Dye Corp.
61 Broadway
New York 6, N. Y.
Solvents & Chemicals Group
2540 Fluornoy St.
Chicago 12, Ill.
Southern Electric Products
P.O. Box 406
Anderson, S. C.
Southern Naval Stores
Columbia, Miss.
Sparkler Manufacturing Co.
Mundelein, Illinois
Specialty Resins Co.
2801 Lynwood Road
Lynwood, Calif.
Spencer Kellogg and Sons, Inc.
Buffalo 5, N. Y.
A. E. Staley Mfg. Co.
Decatur 60, Ill.
Standard Oil Company of Ohio
Cleveland, Ohio
Standard Ultramarine & Color Co.
Huntington, West Virginia
K. A. Steel Chemicals Inc.
7450 Stony Island Avenue
Chicago 49, Ill.
Stein, Hall & Company, Inc.
285 Madison Ave.
New York, N. Y.
The Stepan Chemical Company
20 North Wacker Drive
Chicago 6, Illinois
Sterling Fleishman Co.
Broomall, Pa.
Stern Can Company, Inc.
71 Locust Street
Boston 25, Mass.
Fred'k A. Stresen-Reuter, Inc.
325 W. Main St.
Bensenville, Ill.
Strobridge Lithographing Company
Cincinnati 12, Ohio
Sturtevant Mill Company
2 Harrison Square
Boston 22, Mass.
Sun Chemical Corp.
Pigments Division
309 Sussex Street
Harrison, N. J.
Sun Oil Company
Philadelphia 3, Pa.
Swenson Associates
19120 W. McNichols Road
Detroit 19, Michigan
Swift & Company
1800 165th Street
Hammond, Indiana
Synthetic Chemicals Inc.
335 McClean Blvd.
Paterson, N. J.
Synthetic Products Company
1636 Wayside Road
Cleveland 12, Ohio
Syntron Company
Homer City, Pa.
Synvar Corporation
Wilmington, Delaware

T

Tamms Industries, Inc.
228 N. La Salle Street
Chicago 1, Ill.
Tennessee Products & Chemical Corporation
350 Fifth Avenue
New York 1, N. Y.
The Thibaut & Walker Co., Inc.
150 Rome Street
Newark 1, N. J.
Thiokol Corporation
Trenton 7, New Jersey
Titanium Pigment Corporation
111 Broadway
New York 6, N. Y.
Towmotor Corporation
1226 E. 152nd Street
Cleveland 10, Ohio
Tri-Homo Corporation
Salem, Massachusetts
Trojan Powder Company
17 N. Seventh Street
Allentown, Pa.
Troy Chemical Company
2859 Frisby Avenue
New York 61, N. Y.
Troy Engine & Machine Co.
Troy, Pennsylvania
Turbo-Mixer
380 Madison Avenue
New York 17, N. Y.

U

U. B. S. Chemicals Corp.
491 Main Street
Cambridge 42, Mass.
Ultra Chemical Works, Inc.
Wood & Shady Streets
Paterson, N. J.
Ultrasonic Engineering Co.
P.O. Box 46
Maywood, Illinois
Union Bag-Camp Paper Corp.
233 Broadway
New York 7, N. Y.
Union Bay State Chemical Co., Inc.
491 Main Street
Cambridge 42, Mass.
Union Carbide Chemicals Co.
Div. of Union Carbide Corp.
30 East 42nd Street
New York 17, N. Y.
Union Carbide Corp.
30 East 42nd Street
New York 17, N. Y.
United Carbon Company, Inc.
Charleston 27, West Virginia
U. S. Borax & Chemical Co.
630 S. Shatto Pl.
Los Angeles, Calif.
United States Bronze Powder Works, Inc.
220 West 42nd Street
New York 36, N. Y.
U. S. Coatings Co.
225 Manida Street
Bronx 59, N. Y.
U. S. Electrical Motors Inc.
Box 2058 Terminal Annex
Los Angeles 54, Calif.
U. S. Industrial Chemicals Company
420 Lexington Ave.
New York, N. Y.
U. S. Mica Company, Inc.
Jordan and Van Dyke Streets
East Rutherford, N. J.
United States Steel Corporation
525 William Penn Place
Pittsburgh 30, Pa.
United States Steel Products
30 Rockefeller Plaza
New York 20, N. Y.
The U. S. Stoneware Company
Akron 9, Ohio
U. S. Testing Co., Inc.
1415 Park Avenue
Hoboken, N. J.
Universal Aviation Equipment, Inc.
362 Fifth Ave.
New York 1, N. Y.

V

van Ameringen-Haebler, Inc.
521 West 57th Street
New York 19, N. Y.
R. T. Vanderbilt Co., Inc.
230 Park Avenue
New York 17, N. Y.
Vansul & Company
Englewood, New Jersey
Velsicol Chemical Corporation
330 East Grand Avenue
Chicago 11, Illinois
Viscatone Chemical Company
Ziegler, Ill.
Vulcan Containers Inc.
Bellwood, Illinois
Vulcan Steel Container Company
Birmingham, Ala.

W

Warwick Wax Co., Inc.
10-10 44th Avenue
Long Island City 1, N. Y.
T. F. Washburn Company
2244 Elston Avenue
Chicago 14, Illinois
West Virginia Pulp and Paper Company
Charleston, South Carolina
Westvaco Chemical Division
Food Machinery & Chemical Corp.
161 E. 42nd Street
New York 17, N. Y.
White Color Card Company
467 Amsterdam
Detroit 2, Mich.
Whiting Corporation
Harvey, Illinois
Whittaker, Clark & Daniels, Inc.
260 West Broadway
New York 13, N. Y.
C. K. Williams & Co.
640 N. 13th Street
Easton, Pennsylvania
W. S. Wilson Corp.
11 S. William Street
New York 4, N. Y.
Wilson & Company
Wilson-Martin Division
Snyder Ave. & Swanson Street
Philadelphia 48, Pa.
Witco Chemical Company
122 E. 42nd Street
New York 17, N. Y.
Woburn Chemical Corporation (N. J.)
1200 Harrison Avenue
Harrison, N. J.
Worthington Corporation
Harrison, N. J.
Wyandotte Chemicals Corporation
Wyandotte, Michigan

Z

G. S. Ziegler & Company
Great Neck Rd.
Great Neck, L. I., N. Y.
Zinsser & Co., Inc.
Sub. of Harshaw Chemical Co.
Hastings-on-Hudson, N. Y.
William Zinsser & Company
516 W. 59th St.
New York 19, N. Y.
Zophar Mills, Inc.
112-130 26th Street
Brooklyn 32, N. Y.

SALES AGENTS DIRECTORY

The following list includes only those companies who are represented by sales agents in the United States, Canada, and Mexico. Branch offices of those firms not using sales agents are not listed.

Advance Solvents & Chemical Division
Carlisle Chemical Works, Inc.

CALIFORNIA
Pacific Coast Chemical Co.
2060 Third Street
Berkeley 10
Stay & Day Paint Materials Co.
363 So. Mission St.
Los Angeles 33

COLORADO
Gillies, Inc.
202-1640 Court Place
P.O. Box 1495
Denver 2

GEORGIA
Charles L. Burks Co.
P.O. Box 54
East Point

ILLINOIS
Carl A. Lechner Co.
1515 West Howard St.
Chicago 26

LOUISIANA
Lastrapes Brothers
322 Board of Trade Arcade
New Orleans 12

KENTUCKY
H. H. Benner Co.
Hoffman Building
Louisville 2

MARYLAND
A. B. Kohl Sales Co.
4615 Edmondson Ave.
Baltimore 29

MASSACHUSETTS
C. K. Mullin, Inc.
160 N. Washington St.
Boston 14 (Paints)

MICHIGAN
Matteson-Van Wey, Inc.
403 Baltimore Ave., W.
Detroit 2

MINNESOTA
Horton-Earl Co.
324 North First St.
Minneapolis 1

MISSOURI
H. R. Hamberg
7273 Maryland Avenue
St. Louis 5
Morton-Myers Co.
27 Southwest Blvd. at Stateline
Kansas City 8

NEW YORK
J. S. Young Co., Inc.
2 Park Avenue
New York 16

NORTH CAROLINA
Charles L. Burks Co.
P.O. Box 1032
Black Mountain

OHIO
The Paul Wiemer Co.
2089 Sherman Avenue
Norwood 12

OREGON
Gillies, Inc.
621 S. W. Morrison Street
Portland 5

PENNSYLVANIA
Van Horn, Metz Co.
241 East Elm Street
Conshohocken
E. E. Zimmerman Co.
Keenan Building
Pittsburgh 22

TEXAS
Roy A. Ribelin Distributing Co.
209 No. Hawkins St.
Dallas 1
Roy A. Ribelin Distributing Co.
570A M & M Building
Houston 2

MEXICO
Alfbeck de Mexico, S.A.
Mexico City, D.F.

Ansbacher-Siegle Corporation

CALIFORNIA
Robert E. Flatow
R. E. Flatow & Co., Inc.
10 Madison Street
Oakland 7

ILLINOIS
Fred A. Jensen
Fred A. Jensen & Assoc.
510 North Dearborn
Chicago 10

NORTH CAROLINA
Anthony Garcia
300 West Earl Street
Apt. 3E Amanda Apts.
Greenville

OHIO
George J. Forman
9016 Outlook Drive
Cleveland

The Baker Castor Oil Co.

CALIFORNIA
Paul W. Wood Company
350 Townsend Street
San Francisco 7

GEORGIA
G. R. Nottingham Co.
1557 Chattahoochee Ave. NW
Atlanta

KENTUCKY
H. H. Benner Company
803 Hoffman Building
Louisville 2

MARYLAND
William McGill
237 President Street
Baltimore 2

MICHIGAN
Krekel Goetz Sales & Supply Co.
302 Houseman Building
Grand Rapids 2
D. H. Osgood Company
4181 Oakman Blvd.
Detroit 4

MINNESOTA
Thompson-Hayward Chemical Co.
909 Second Street, South
Minneapolis 15

MISSOURI
H. A. Baumstark & Co.
6801 Hoffman Avenue
St. Louis 9

MISSOURI (cont'd)
Thompson-Hayward Chemical Co.
2915 Southwest Blvd.
Kansas City

OHIO
National Lead Company
1776 Columbus Road
Cleveland 13
C. L. Zimmerman Co.
N-303 Union Terminal
Cincinnati 3

OKLAHOMA
Thompson-Hayward Chemical Co.
3909 S. Meridan Ave.
P.O. Box 1008, Southwest Station
Oklahoma City
Thompson-Hayward Chem. Co.
36 N. Guthrie Street
Tulsa 3

OREGON
W. M. Gillies, Inc.
American Bank Building
621 S. W. Morrison
Portland 5

PENNSYLVANIA
E. W. Kaufmann
P.O. Box 447
Flourtown
E. E. Zimmerman Co.
Keenan Building
Pittsburgh 22

TEXAS
Thompson-Hayward Chem. Co.
2627 Weir St.
P.O. Box 6226
Dallas
Thomson-Hayward Chem. Co.
1701 Oliver St.
Houston 13

WASHINGTON
W. R. Benson, Inc.
820 First Avenue, South
Seattle 4

CANADA
Turpentine & Rosin Prod., Corp.
1801 St. Patrick St.
Montreal
Turpentine & Rosin Prod. Corp.
17 River Street
Toronto, Ontario

Barrett Division

CALIFORNIA
Pacific Coast Chemicals Co.
2060 Third Street
Berkeley 10
E. B. Taylor Co.
442 Colyton Street
Los Angeles 13

ILLINOIS
Cary Company
228 N. LaSalle St.
Chicago

LOUISIANA
Lastrapes Brothers
322 Board of Trade Place
New Orleans

MASSACHUSETTS
Truesdale Co.
52 Cambridge Street
Allston 34

NORTH CAROLINA
C. L. Burks & Co.
P.O. Box 1032
Black Mountain

OHIO
J. H. Hinz Co.
405 Rockefeller Building
Cleveland

TEXAS
Roy A. Ribelin Distributing Co.
209 N. Hawkins St.
Dallas 26
Roy A. Ribelin Distributing Co.
570 A M & M Building
Houston 2

WISCONSIN
R. L. Ferguson
229 E. Wisconsin Avenue
Milwaukee 2

CANADA
Drew, Brown, Ltd.
5410 Ferrier St.
Montreal, Quebec
Drew, Brown, Ltd.
50 Titan Road
Toronto 18, Ontario

Bennett Industries, Inc.

CALIFORNIA
A. J. Lynch & Co.
2424 Blanding Street
Alameda
A. J. Lynch & Co.
4560 E. 50th Street
Los Angeles 58

COLORADO
Robert E. Quick Co.
949 Clayton Way
Denver

GEORGIA
Charles L. Burks & Co.
P.O. Box 54
East Point

IOWA
Frank Seitz Sales Co.
1510 31st Street
Des Moines 11

KENTUCKY
Argus Company
305 Madrid Building
Louisville

LOUISIANA
Lastrapes Brothers
322 Board of Trade Place
New Orleans

MASSACHUSETTS
The Truesdale Co.
52 Cambridge St.
Allston 34

MICHIGAN
Peerless Plating
2554 S. Getty Street
Muskegon

MINNESOTA
Willard N. Swanson Co.
1015 N. Third
Minneapolis 1

MISSOURI
Ack Sales Co.
901 East 13th Avenue
North Kansas City 16
J. E. Niehaus & Co., Inc.
3419 Gratiot Street
St. Louis 3

NEBRASKA
French Brokerage Co.
1402 Nicholas Street
Omaha 2

NEW YORK
Chemical Distributors, Inc.
1665 Main Street
Buffalo 9
Murray Oil Prod. Co., Inc.
21 West Street
New York
Shamrock Chemical Corp.
420 Lexington Avenue
New York

NORTH CAROLINA
Charles L. Burks & Co.
P.O. Box 1032
Black Mountain
Charles L. Burks & Co.
P.O. Box 1666
High Point

OHIO
The Paul Wiemer Co.
2089 Sherman Avenue
Cincinnati 12

OHIO
Donald McKay Smith Co.
550 Hanna Building
Cleveland 15

OREGON
Cordano Chemical Co.
56 S. E. Belmont St.
Portland 14

PENNSYLVANIA
R. Peltz Company
218 Wilford Building
Philadelphia 4

TENNESSEE
L. E. Offutt Company
431 N. Dunlap Street
Memphis

TEXAS
R. B. Patterson & Co.
P.O. Box 7314
7514 Kaywood Avenue
Dallas 9

WASHINGTON
D. B. Smith & Co.
1016 First Avenue, South
Seattle 4
Pearson & Smith
West 1133 College Avenue
Spokane

The California Ink Company, Inc.

COLORADO
Gillies Western Corp.
Mr. Doug Calder
322-1645 Court Place
P.O. Box 1495
Denver 2

GEORGIA
Deeks and Company
Mr. R. C. Fromant
1101 Zonolite Road, N.E.
Atlanta

ILLINOIS
J. W. Van Tuin Company
5844 Lincoln Avenue
Chicago 45

MINNESOTA
M. H. Baker Company
1645 Hennepin Avenue
Minneapolis 3

NEW YORK
D. B. Becker Company
150 Nassau Street
New York 38

OHIO
Deeks and Company
6433 Wiehe Road
Golf Manor
Cincinnati 13
The Dimlich-Radcliffe Co.
13125 Shaker Square
Cleveland 20

OREGON
Mr. John C. Robinson
7637 S. E. 31st Avenue
Portland

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue South
Seattle 4

Carbon Dispersions, Inc.

CALIFORNIA
E. S. Browning Co.
2321 Yates Avenue
Los Angeles 22
E. S. Browning Co.
1515 Third Street
San Francisco 7

COLORADO
E. C. Stone Co.
136 West 12th Ave.
Denver 4

FLORIDA
A. J. Passonno
P.O. Box 623
Tampa

ILLINOIS
D. R. Fitzgerald
1005 Belmont Avenue
Chicago

LOUISIANA
Thompson-Hayward Chemical Co.
3111 Lowerline Avenue
New Orleans

MASSACHUSETTS
Lukens Chemical Co.
227 California Street
Newton 58

MISSOURI
Ack Sales Co.
901 East 13th Avenue
North Kansas City 16
Thompson-Hayward Chemical Co.
5 Carr Street
St. Louis

NEW YORK
C. Withington Co.
47-40 5th Street
Long Island City 1

NEW YORK
F. F. Salamon Co.
Box 309
Nyack
Arthur Somers
11 Ormond Street
Rockville Centre

OHIO
The Paul Wiemer Co.
2089 Sherman Avenue
Cincinnati 12
Dimlich & Radcliffe
13125 Shaker Square
Cleveland

PENNSYLVANIA
A. C. Hurlbrink
3701 N. Broad St.
Philadelphia
J. C. Ackerman Co.
Penn-Lincoln Hotel
Pittsburgh 21

Chisholm-Ryder Company of Pennsylvania

CALIFORNIA
Watts King Company
3404 N. Figueroa Street
Los Angeles 65
Food Equipment & Supply Co.
210 Mississippi St.
San Francisco 7

COLORADO
E. F. DeLine Company
224 W. Alameda Avenue
Denver 9

GEORGIA
The Hoshall Company
1414 Morningside Dr., N.E.
Atlanta 6

ILLINOIS
Ward Equipment Sales
8109 S. Ashland Avenue
Chicago 20

MICHIGAN
G. R. Williams Sales
1619 Progress Street
Lincoln Park

MINNESOTA
S. Rickes & Sons
240-10 Avenue South
Minneapolis 15

NEW YORK
William B. Sanford, Inc.
601 West 26th Street
New York 1

TEXAS
Leon C. Osborn Co., Inc.
P.O. Box 1346
Harlingen

WASHINGTON
Duncan Equipment Company
506 Broadway
Seattle 22

WISCONSIN
Schroeder Mc-Key Company
2740 S. 32 Street
Milwaukee 46

CANADA
T. W. MacKay & Son Ltd.
1807 Fir Street
Vancouver, B. C.

Colton Chemical Company

LOUISIANA
Breffeilh & Sheahan
P.O. Box 13222
New Orleans 25

MARYLAND
A. B. Kohl Sales Co.
4615 Edmondson Avenue
Baltimore 29

MASSACHUSETTS
Morris A. Kimmel
4-Phillips Terrace
Swampscott

NEW YORK
Leo P. Coff
Seaboard Chemical Corp.
198 Broadway
New York 38

OREGON
Van Waters & Rogers, Inc
3950 N. W. Yeon St.
Portland 10

PENNSYLVANIA
Harry W. Gaffney
1510 Girard Trust Bldg.
Philadelphia 2

SOUTH CAROLINA
Moretex Chemical Products, Inc.
P.O. Box 2528
Spartanburg

TENNESSEE
Robert F. Sheahan Co.
Suite No. 728, M & M Building
198 S. Main St.
Memphis 3

TEXAS
Van Waters & Rogers, Inc.
P.O. Box 1891
10216 Denton Road
Dallas 9
Van Waters & Rogers, Inc.
5403 Kriby Drive
Houston

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue, South
Seattle 4

Columbian Carbon Company

CALIFORNIA
Martin, Hoyt & Milne
906 East 3rd Street
Los Angeles 13
Martin, Hoyt & Milne
Merchants Exchange Bldg.
San Francisco 4

COLORADO
Application Engineers, Inc.
100 East Jefferson
Englewood (Denver)

GEORGIA
Charles L. Burks & Co.
P.O. Box 54
Atlanta (East Point)

ILLINOIS
The Cary Co.
228 N. LaSalle St.
Chicago 1

KENTUCKY
Wm. B. Tabler Co.
P.O. Box 1254
Louisville 1

LOUISIANA
Roy T. Cucullu Company
4818 Lancelot Drive
New Orleans 22

MINNESOTA
Willard N. Swanson Co.
1015 N. 3rd St.
Minneapolis 1

MISSOURI
Abner Hood Chemical Co.
507-517 N. Montgall Ave.
Kansas City 20
J. E. Niehaus & Co.
3419-21 Gratiot St.
St. Louis 3

NORTH CAROLINA
Charles L. Burks & Co.
P.O. Box 1032
Black Mountain

OREGON
Martin, Hoyt & Milne
1501 Northwest Kearney
Portland 12

TEXAS
Roy A. Ribelin Dist. Co.
209 N. Hawkins
Dallas 26
Roy A Ribelin Dist. Co.
570-A M & M Building
Houston 2

WASHINGTON
Martin, Hoyt & Milne
1016 First Ave. S.
Seattle 4

Corn Products Sales Co.

CALIFORNIA
Johnson, Carvell and Murphy
P.O. Box 75218
Sanford Station
Los Angeles 5

Johnson, Locke Mercantile Co.
64 Pine Street
San Francisco 11

NEW YORK
C. J. Erwin Co.
536 Ellicott Square
Buffalo 3

OHIO
Mr. A. S. Brown
2000 W. Central Ave.
Toledo

HAWAII
Birk Brothers
P.O. Box 2784
Honolulu, T. H.

Crownoil Chemical Company

NEW YORK
D. H. Litter Co.
114 East 16 Street
New York

PENNSYLVANIA
George A. Rowley & Co.
937 North Front St.
Philadelphia

The J. H. Day Company

ALABAMA
D. B. Gooch Assoc.
5018 First Avenue N.
Birmingham

CALIFORNIA
Charles J. Doris
13232 Otsego Street
Van Nuys

TEXAS
Frank Haile
4231 Valley Ridge Road
Dallas

MEXICO
T. & Hijos De la Pena
Nazas 45A. Col.
Cuauhtemoc, Mexico, D. F.

De Lore Division
National Lead Company

CALIFORNIA
A. J. Lynch & Co.
2424 Blanding Street
Alameda
A. J. Lynch & Co.
4560 East 50th St.
Los Angeles 58

COLORADO
L. H. Herr Company
712 Interstate Trust Bldg.
16th & Lawrence Sts.
Denver 2

ILLINOIS
The Cary Co.
228 North LaSalle St.
Chicago 1

KENTUCKY
Wm. B. Tabler Co.
P.O. Box 1254
Louisville 1

LOUISIANA
Roy T. Cucullu Co.
4818 Lancelot Dr.
New Orleans 22

MASSACHUSETTS
T. H. Cushman Co.
84 Winchester St.
Newton Highlands, 61

MICHIGAN
Baker & Collinson Co.
12000 Mt. Elliot Avenue
Detroit 12

MINNESOTA
Lyon Chemicals, Inc.
2305 Hampden Avenue
St. Paul 4

MISSOURI
Thompson-Hayward Chemical Co.
29th & Southwest Blvd.
Kansas City 8

NEW YORK
Columbian Carbon Co.
380 Madison Avenue
New York 17

OHIO
B. H. Roettker & Co.
3732 Lovell Ave., Cheviot
Cincinnati 11
Harshaw Chemical Co.
1945 E. 97 St.
Cleveland 6

PENNSYLVANIA
Dowdy Brothers
Wilford Building
N. E. Cor. 33rd & Arch Sts.
Philadelphia 4

TEXAS
Thompson-Hayward Chemical Co.
P.O. Box 6226
Dallas
Thompson-Hayward Chemical Co.
1701 Oliver Street, P.O. Box 4557
Houston 13

CANADA
Canadian Titanium Pigments, Ltd.
630 Dorchester St. West
Montreal 2, Quebec
Canadian Titanium Pigments, Ltd.
Room 304, Terminal Bldg.
Foot of York St.
Toronto 1, Ontario
Canadian Titanium Pigments, Ltd.
1428 Granville St.
Vancouver, B. C.

Dewey and Almy Chemical Company

WASHINGTON
D. B. Smith Co.
1016 First Avenue, South
Seattle 4

CANADA
Drew Brown Limited
5410 Ferrier Street
Montreal 16
Drew Brown Limited
50 Titan Road
Toronto 18, Ontario

Diamonite Products Mfg. Co.

CALIFORNIA
A. J. Lynch & Co.
4560 E. 50th Street
Los Angeles

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver

FLORIDA
A. J. Passonno Company
107-22nd Street
Belleair Beach

ILLINOIS
Fred A. Jensen & Associates
10 North Dearborn Street
Chicago

KENTUCKY
J. J. Daly Company
8 Elm Street
Ludlow

MICHIGAN
George E. Moser & Son, Inc.
961 Penobscot Building
Detroit

MINNESOTA
I. H. Baker Company
645 Hannepin Avenue
Minneapolis

MISSOURI
Abner Hood Chemical Co.
507 N. Montgall Avenue
Kansas City
Harry G. Knapp
4918 Washington Blvd.
St. Louis

NEW YORK
Jesse S. Young Co., Inc.
2 Park Avenue
New York

OHIO
American Manufacture Export Assoc.
P.O. Box 771
Canton

TEXAS
Ducros & Company, Inc.
P.O. Box 3945
2860 East 130th Street
Dallas
Ben Kanowsky, Inc.
5513 Maple Avenue
P.O. Box 7313
Dallas

WASHINGTON
Great Western Chemical
6921 E. Marginal Way
Seattle

The Eagle-Picher Company

GEORGIA
W. J. Baldridge
P.O. Box 96, Station A
Atlanta 10

Eastman Chemical Products, Inc.

ARIZONA
Wilson Meyer Co.
112 North Central
Phoenix

CALIFORNIA
Wilson Meyer Co.
4800 District Boulevard
Los Angeles 58
Wilson Meyer Co.
333 Montgomery Street
San Francisco 4

COLORADO
Wilson Meyer Co.
851 North Broadway
Denver 3

OREGON
Wilson Meyer Co.
520 S. W. 6th Avenue
Portland 4

UTAH
Wilson Meyer Co.
73 South Main Street
Salt Lake City

WASHINGTON
Wilson Meyer Co.
821 Second Avenue
Seattle 4
Wilson Meyer Co.
422 West Riverside
Spokane

Elgin Manufacturing Company

CALIFORNIA
The Watts King Co.
3404 N. Figueroa St.
Los Angeles 65
Wayne Hall & Dwight Landreth
Food Equipment and Supply, Inc.
210 Mississippi St.
San Francisco 7
Food Machinery & Chemical Corp.
P.O. Box 760
San Jose 6

COLORADO
Halsell Brokerage Co.
3101 Walnut St.
Denver 5

GEORGIA
The Hoshall Company
1414 Morningside Dr., N.E.
Atlanta

ILLINOIS
Webster Equipment Co.
549 W. Randolph St.
Chicago 6
Universal Mercantile Co.
550 Cherokee Rd.
Highland Park

LOUISIANA
Albert Green
R. P. Anderson Co.
201 Bd. of Trade Annex
New Orleans

MASSACHUSETTS
Phil Sanford
William B. Sanford, Inc.
59 Carl St.
Newton Highlands

MICHIGAN
G. R. Williams
1619 Progress St.
Lincoln Park 25

MINNESOTA
Booth & Associates
1932 Drew Ave. So.
Minneapolis 16

MISSOURI
Martin O. Tiemann
1023 N. Grand Blvd.
St. Louis 6

NEW JERSEY
Henry G. Manley
William B. Sanford, Inc.
115 N. Brookfield Road
Haddonfield

NEW YORK
William B. Sanford, Inc.
601 W. 26th St.
New York 1
American Steel Export
347 Madison Avenue
New York 17
Anglo-African Shipping Company of New York
16 E. 34th St.
New York
Harold E. Colburn
William B. Sanford, Inc.
82 St. Paul Street
Rochester 4

TEXAS
R. P. Anderson Co.
2503 W. Mockingbird Lane
Dallas 19
H. W. Eversole
R. P. Anderson Co.
514 W. Main St.
Houston 6
H. T. Lawler & Sons
731-739 Perez
San Antonio

WASHINGTON
Duncan Equipment Co.
506 Broadway
Seattle 22

CANADA
J. A. Sabourin
Canners Machinery Ltd.
10850 Urbain St.
Montreal
T. C. Fenton
Wellington at 3rd Ave.
Simcoe, Ontario
Canners Machinery Ltd.
Simcoe, Ontario
Thos. W. MacKay
1807 Fir St.
Vancouver 9, B. C.
Waller Sales Ltd.
454 King St.
West Toronto

Emery Industries, Inc.

MICHIGAN
F. B. Farmer
Ecclestone Chemical Co.
2673 Guoin Street
Detroit

Farnow, Inc.

CALIFORNIA
Dorsett & Jackson, Inc.
840 East 60th Street
Los Angeles 1
Carmona Chemical Company
1001 17th Street
San Francisco 17

NEW YORK
Jesse S. Young Co., Inc.
2 Park Avenue
New York 16

PENNSYLVANIA
John J. McCullion
2615 E. Westmoreland St.
Philadelphia 34

Fein's Tin Can Co., Inc.

FLORIDA
Mr. Joseph Safer
Smith Bottle & Supply Co.
Jacksonville
Mr. Jack Emmer
Magic City Bottle Supply
Miami

GEORGIA
Mr. Morris Smith
Smith Can Company
Atlanta

MARYLAND
Mr. Jack Gersh
Gersh & Company
Baltimore

MASSACHUSETTS
Mr. H. B. Lewis
Herbert B. Lewis Co.
Boston

MICHIGAN
Mr. George Horsfull
George Horsfull & Co.
Detroit

OHIO
Mr. Edwin Blatt
Continental Barrel & Drum
Cincinnati
Mr. Charles Rice
Rice & Company
Cleveland
Mr. Sidney Blatt
Columbus Drum & Barrel
Columbus

PENNSYLVANIA
Mr. A. J. Cohen
Standard Can Corp.
Pittsburgh

OHIO
Howard Dock
309 Ludlow Avenue
Cincinnati 20
F. W. Kamin Company
14820 Detroit Avenue
Lakewood 7

OKLAHOMA
Mr. Tom Rullman
P.O. Box 543
Oklahoma City 1

Sterling Fleischman Co.

CALIFORNIA
A. J. Lynch & Co.
2424 Blanding Avenue
Alameda
The Lee Potter Co.
418-B N. Glendale Ave.
Glendale 6
Roll Rite Corp.
801 Jefferson St.
Oakland 7

CONNECTICUT
The S. L. Cooke Co.
P.O.Box 96
Banford

FLORIDA
James W. Grady Co.
915 W. Adams St.
Jacksonville

GEORGIA
Shepherd Equipment Co.
900 Walton Building
Atlanta 3
James E. Watson & Co.
P.O. Box 68
Marietta

ILLINOIS
K. Lightbourne & Assoc.
7117 W. Roosevelt Road
Berwyn

MASSACHUSETTS
Stanley Handling Equip. Co.
36 Ramah Circle
Agawam
G. C. McClellan & Co.
101 Tremont Street
Boston 8

MICHIGAN
Bockstanz Brothers
1205 Beaufait Avenue
Detroit 7

MISSOURI
Elmer E. Sharp & Associates
Box 8406
Kansas City 14
John J. Connell Co.
3014 Olive Street
St. Louis 5

NEW JERSEY
Peter I. Meyer
P.O. Box 554, Allwood Station
Clifton

NEW MEXICO
Gail Patrick Sales & Engr.
10214 Propps Dr. N. E.
Albuquerque

NEW YORK
J. E. Dumas & Co., Inc.
92 Central Avenue
Albany
Hohl Industrial Sales Co.
1540 Niagara Street
Buffalo 13
Richard S. Appleton, Inc.
P.O. Box 95
Jackson Heights 72
M. Neumunz & Son
90 West Street
New York 6
Insley-McEntee Equipment Co.
25 N. Washington Street
Rochester 14

NORTH CAROLINA
Blue Ridge Hardware & Supply Co.
P.O. Box 815
Lenoir

OHIO
E. J. Moriarty & Co.
8821 Kenwood Avenue
Cincinnati 42
Ohio Equipment Company
1658 St. Clair Avenue, N.E.
Cleveland 14
Eldon Sterling
320 N. Buckeye Street
Wooster

PENNSYLVANIA
Anderson Equipment Co.
P.O. Box 142
LaFayette Hill
Clayton DeNault
246 W. Upsal Street
Philadelphia 19
John G. Bryant Co.
101 E. Township Line Road
Upper Darby

TENNESSEE
Wursburg Brothers, Inc.
710-724 South Fourth Street
Memphis 2

VIRGINIA
Associated Sales Company
P.O. Box 1019
Richmond 9
S. L. Cooper Company
7300 Washington Highway
Richmond

WISCONSIN
John G. Steger & Assoc.
2318 N. 90th Street
Wauwatosa 13

CANADA
Prenco Progress & Engr. Corp.
72 Stafford Street
Toronto, Ontario

MEXICO
Importadora Y Distributadora
Calle Natias Romero #1011-2
Colonia Del Valle
Mexico 12, D.F.

Foremost Food and Chemical Company

ILLINOIS
M. B. Sweet Company
9100 South Park Avenue
Chicago 19

KANSAS
Vulcan Sales Company
5920 Nall
Mission

MASSACHUSETTS
N. S. Wilson & Sons
150 Causeway Street
Boston 14

MICHIGAN
Harry Holland & Son, Inc.
10600 Puritan Avenue
Detroit 38

MINNESOTA
M. H. Baker Company
1645 Hennepin Avenue
Minneapolis 3

NEW YORK
H. Reisman Corporation
114 Liberty Street
New York 6

Georgia Marble Company

ALABAMA
A. Byron Couch, Jr.
827 West Alabama
Florence

CALIFORNIA
Pacific Coast Chemicals Co.
2060 Third Street
Berkeley 10
John K. Bice Company
440 Seaton Street
Los Angeles

COLORADO
George C. Brandt, Inc.
1920 Market Street
Denver

FLORIDA
Ashton E. Garner Company
213 S. Myrtle Avenue
Clearwater

GEORGIA
R. T. Hopkins Company
544 Means Street, N. W.
Atlanta

ILLINOIS
Daniel G. Hereley Company
1607 Howard
Chicago 26

KANSAS
Morton-Myers Company
27 Southwest Blvd.
Kansas City

KENTUCKY
The L. A. Miller Company
512 Republic Building
Louisville

LOUISIANA
Griffith-Mehaffey Co., Inc.
102 Poydras Street
New Orleans

MASSACHUSETTS
Wyrough and Loser
751 Main Street
Waltham 54

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 4

MISSOURI
G. S. Robins & Company
126 Chouteau Avenue
St. Louis

NEW JERSEY
Wyrough and Loser
838 Broad St. Bank Bldg.
Trenton 8

NEW YORK
Smith Chemical & Color Co.
55 John Street
Brooklyn
Nuodex International, Inc.
511 Fifth Avenue
New York 17

OHIO
Anderson & Company
547 Aqueduct Avenue
Akron
Deeks and Company
6433 Wiehe Road
Cincinnati

OHIO
Norman G. Schabel Company
20950 Center Ridge Road
Cleveland 16

OREGON
W. Ronald Benson, Inc.
2505 S. E. 11th Avenue
Portland 2

PENNSYLVANIA
Joseph A. Burns
124 Harrison Avenue
Pittsburgh

SOUTH CAROLINA
A. B. Wood Company
644 E. Stone Avenue
Greenville

TENNESSEE
Chapman Chemical Company
60 North Third Street
Memphis

TEXAS
W. W. Richardson Company
712 Unit 2 Santa Fe Bldg.
Dallas
Joe Coulson Company
2525 Cline Street
Houston

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue, South
Seattle 4

WISCONSIN
Harold T. Illing Company
4200 West Monarch Place
Milwaukee

CANADA
Frank E. Dempsey & Company
5811 Sherbrooke St., West
Montreal 28, Quebec
Frank E. Dempsey & Company
266 Parliament Street
Toronto 2, Ontario
Commercial Chemicals
Div. of Standard Chem. Co., Ltd.
Pier H, Ft. Carrall Street
Vancouver, British Columbia

Harshaw Chemical Co.

CALIFORNIA
A. J. Lynch & Co.
Alemeda

GEORGIA
Deeks and Co.
Atlanta

INDIANA
August Hoffman and Co.
Indianapolis

IOWA
Dico Co.
Des Moines

KENTUCKY
The L. A. Miller Co.
Louisville

LOUISIANA
Barada and Page, Inc.
New Orleans

MARYLAND
William McGill
Baltimore

MASSACHUSETTS
The Truesdale Co.
Allston

MICHIGAN
The Walgren Co.
Grand Rapids

MINNESOTA
Willard N. Swanson
Minneapolis

MISSOURI
Independent Oil Co.
St. Louis

OREGON
Great Western Chemical Co.
Portland

TENNESSEE
Peirson-Deakins Company
Chattanooga

WASHINGTON
Great Western Chemical Co.
Seattle

Hayden Mica Company, Inc.

CALIFORNIA
Pacific Coast Chemicals Co.
2060 Third Street
Berkeley 10
John K. Bice Co.
440 Seaton Street
Los Angeles 13

ILLINOIS
Harry Holland & Son, Inc.
9 South Clinton Street
Chicago 6

MASSACHUSETTS
Ernest Jacoby & Co., Inc.
585 Boylston Street
Boston 16

NEW YORK
Superior Materials, Inc.
120 Liberty Street
New York 6

OHIO
Donald McKay Smith, Inc.
550 Hanna Building
Cleveland 15

OREGON
W. Ronald Benson, Inc.
2505 S. E. 11th Street
Portland

PENNSYLVANIA
J. C. Ackerman Company
Penn-Lincoln Hotel
Pittsburgh 21

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue South
Seattle 4

CANADA
Prescott & Company, Reg'd.
2209 Hingston Avenue
Montreal 28, P.Q.

Hercules Filter Corp.

CALIFORNIA
E. J. Brinkmeyer
136 No. Orlando Avenue
Los Angeles
C. V. Krause
41 Sacramento St.
San Francisco

FLORIDA
Thompson Equipment Co.
631 Rue Max
Pensacola

GEORGIA
Rittelmeyer & Co.
P.O. Box #1308
Atlanta

ILLINOIS
E. F. Daly
1037 Wisconsin Ave.
Oak Park

LOUISIANA
Thompson Equipment Co.
4020 Thalia Street
P.O. Box #13063
New Orleans

MISSOURI
Carel van Luin
153 Perthshire Rd.
Glascow Village
St. Louis 15

NEW JERSEY
George Zebora
P.O. Box #183
Little Falls

NEW YORK
C. H. Love
421 Chamber of Commerce Bldg.
Buffalo
VATco Engrg. Co.
150 Broadway
New York

OHIO
R. H. Keene
1900 Euclid Bldg.
Cleveland

TEXAS
Howard Hagood Co.
P.O. Box #175
Bellaire

Holland Color & Chemical Company

CALIFORNIA
W. M. Gillies, Inc.
Los Angeles
Ramco
Oakland

COLORADO
George C. Brandt, Inc.
Denver

GEORGIA
Triangle Chemical Co.
Atlanta

ILLINOIS
D. G. Hereley Co.
Chicago

KANSAS
George C. Brandt, Inc.
Kansas City

MARYLAND
Wm. McGill
Baltimore

MASSACHUSETTS
Herbert B. Lewis Co.
Boston

MICHIGAN
Matteson-Van Wey, Inc.
Detroit

MINNESOTA
George C. Brandt, Inc.
St. Paul

MISSOURI
H. A. Baumstark Co.
St. Louis

NEW YORK
G. A. Paine Co.
New York

OHIO
T. C. Kiesel
Cincinnati
A. C. Mueller Co.
Cleveland

PENNSYLVANIA
O. L. West Co.
Wynnewood

TENNESSEE
Robert F. Sheahan Co.
Memphis

WISCONSIN
J. W. Copps
Milwaukee

CANADA
Drew Brown, Ltd.
Montreal, P.Q.
Drew Brown, Ltd.
Toronto, P.O.
Drew Brown, Ltd.
Vancouver, B.C.

MEXICO
Egon Meyer
Mexico, D.F.

Hope Machine Company

CALIFORNIA
Economic Machinery
99 Hamilton Ave.
Palo Alto

MASSACHUSETTS
. A. Whitney Co.
0 Kearney Road
Needham

MISSOURI
Packaging Equipment, Inc.
2012 Olive Street
St. Louis

NEW YORK
Arthur J. Rocke Co.
431 Fifth Avenue
New York 16

CANADA
Richardson Agencies, Ltd.
P.O. Box 8-Station T
164 Bentworth Avenue
Toronto 19

International Engineering, Inc.

CALIFORNIA
G. M. Cooke Company
920 Grayson St.
Berkeley 10
Gene D. Pribble Co.
5416 E. Beverly Blvd.
Los Angeles 22

FLORIDA
James M. Evans
P.O. Box 1563
211-½ So. Tennessee Ave.
Lakeland

INDIANA
Gilbert C. Moore
540 E. 32 Street
Indianapolis 5

LOUISIANA
D. A. Warriner Instrument Sales & Service
7920 Zimple St.
New Orleans 18
Warren Engineering Sales Co.
P.O. Box 7
Westlake

MICHIGAN
DuBois-Webb Co.
19951 James Couzens Highway
P.O. Box 5217
Detroit 35
DuBois-Webb Co.
900 Monroe N.W.
Grand Rapids 2

MINNESOTA
Louis J. Baker
11908 Minnetonka Blvd.
Minneapolis

MISSOURI
Process Engrg. & Equipment
331 Thornton Ave.
St. Louis 19

NEW YORK
Forster-Johnston
1245 McKinley Parkway
P.O. Box 53 Lackawanna Branch
Buffalo 18
A. P. Weber
15 Park Row
New York 38

NORTH CAROLINA
Robt. S. Hudgins Co.
P.O. Box 6091
Charlotte 7

OHIO
Plant Equipment Company
P.O. Box 2625 Lakewood Branch
Cleveland 7

PENNSYLVANIA
D. N. Carlin Company
132 So. Whitfield St.
Pittsburgh 6

TENNESSEE
Craig Industrial Equip. Co.
P.O. Box 5776
1101 Poplar Ave.
Memphis 4

TEXAS
Datum Engineering Co.
P.O. Box 314
Bellaire

WISCONSIN
P. H. Lebzelter
P.O. Box 115
Menasha

Kinetic Dispersion Corporation

CALIFORNIA
A. J. Lynch & Company
2424 Blanding Street
Alameda
A. J. Lynch & Company
4560 E. 50th Street
Los Angeles 58

COLORADO
Thompson-Hayward Chem. Co.
1501 W. 13th Avenue
Denver 4

FLORIDA
Palmer Supplies Co. of Fla.
Palmer Building
209-211 E. Robinson Avenue
Orlando

ILLINOIS
Philip E. Calo Company
333 North Michigan Avenue
Chicago 1

KENTUCKY
C. L. McGuire & Company
137 St. Matthews Avenue
Louisville 7

LOUISIANA
Thompson-Hayward Chem. Co.
3111 Lowerline
P.O. Box 4068-Station F
New Orleans 18

MARYLAND
William McGill
237 President Street
Baltimore 2

MINNESOTA
Thompson-Hayward Chem. Co.
909 Second Street South
Minneapolis 16

MISSOURI
Thompson-Hayward Chem. Co.
2915 Southwest Boulevard
Kansas City 8
Thompson-Hayward Chem. Co.
No. 5 Carr Street
St. Louis 2

OHIO
Rice & Company
325 Bulkley Building
Cleveland 15

PENNSYLVANIA
The W. J. Grant Company
38 Maplewood Avenue
Philadelphia 44

TEXAS
Thompson-Hayward Chem. Co.
P.O. Box 6226
Dallas 1
Thompson-Hayward Chem. Co.
P.O. Box 4557
2600 Crockett
Houston 13
Thompson-Hayward Chem. Co.
P.O. Box 323
Lubbock
Thompson-Hayward Chem. Co.
P.O. Box 126-Grayson St. Station
222 Seguin
San Antonio 8

CANADA
Charles Tennant & Co., Ltd.
Room 440
6555 Cote Des Neiges Road
Montreal 26, Quebec
Charles Tennant & Co., Ltd.
1303 Yonge Street
Toronto 7, Ontario

Manton Gaulin Manufacturing Co., Inc.

ALABAMA
D. B. Gooch Associates, Inc.
5018 First Avenue, North
Birmingham 6

CALIFORNIA
E. M. Underwood and Co.
3319 Beverly Boulevard
Los Angeles 4
E. M. Underwood and Co.
1022 Taraval Street
San Francisco 16

COLORADO
Alldredge & McCabe
847 East 17th Avenue
Denver 18

CONNECTICUT
Ellinger and Ober
Mt. Carmel P.O. Box 56
2464 Whitney Avenue
New Haven 18

FLORIDA
Johnson Roney II and Associates
P.O. Box 26
Clearwater

ILLINOIS
Fuente and Webster, Inc.
549 West Randolph Street
Chicago 6

INDIANA
Avels Sales & Engineering Co.
1728 West 16th Street
Indianapolis

MICHIGAN
H. A. Reed Company
19465 James Couzens Highway
Detroit 35

MINNESOTA
George R. Mellema Company
620 Plymouth Building
Minneapolis 3

MISSOURI
Wharton L. Peters Machinery Company
3863 West Pine Boulevard
St. Louis 8

NEW JERSEY
Frederick E. Herstein & Associates
Benninger Building
1429 Route 22
Mountainside

NEW YORK
Forster-Johnston Company
1245 McKinley Parkway
P.O. Box 53, Lackawanna Branch
Buffalo 18
Kenneth S. Valentine, Inc.
112 West 81st Street
New York 24

OHIO
White Industrial Sales & Equipment Company
919 Second National Building
Akron 8
White Industrial Sales & Equipment Company
140 West Sixth Street
Cincinnati 2
White Industrial Sales & Equipment Company
227 Hanna Building
Cleveland 15

OKLAHOMA
Edward Soph Company
202 East 18th Street
Tulsa

PENNSYLVANIA
R. W. Fox Company
P.O. Box 196
Newton Square
White Industrial Sales & Equipment Co.
1312 Farmers Bank Building
Pittsburgh 22

SOUTH CAROLINA
The Textile Shops
Spartanburg

TEXAS
Edward Soph Company
768A M & M Building
Houston 2

WEST VIRGINIA
White Industrial Sales & Equipment Company
1033 Quarrier Building
Charleston 1

CANADA
Richardson Agencies, Ltd.
640 Laurentian Blvd., Suite 4
Montreal 9, P. Q.
Richardson Agencies, Ltd.
Rear 18 Holly Street
Toronto, Ontario
Harvey Carruthers
9 East Broadway
Vancouver 10, B.C.

Metals Disintegrating Company, Inc.

CALIFORNIA
E. M. Walls Co.
353 Sacramento Street
San Francisco 11
American Mineral Spirits Co., Western
8600 South Garfield Avenue
South Gate

COLORADO
George C. Brandt, Inc.
1920 Market Street
Denver 2

GEORGIA
R. T. Hopkins Co.
544 Means Street, N. W.
Atlanta
J. R. Phillips
Charles L. Burks & Co.
P.O. Box 54
East Point

ILLINOIS
Daniel G. Hereley Co.
1607 W. Howard Street
Chicago

KANSAS
George C. Brandt, Inc.
3150 Fiberglas Road
Kansas City 15

KENTUCKY
Lewis & Co. of Kentucky, Inc.
102 W. Main Street
Louisville 2

LOUISIANA
Breffeilh & Sheahan Co.
P.O. Box 13222
New Orleans 25

MASSACHUSETTS
The Truesdale Co.
52 Cambridge Street
Allston 34

MICHIGAN
Quigley & Milke
16134 E. Warren Avenue
Detroit 24

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

MISSOURI
J. E. Niehaus & Co., Inc.
3419-21 Gratiot Street
St. Louis 3

NEW JERSEY
American Mineral Spirits Co.
Mountain Avenue
Murray Hill

NEW YORK
American Weldrock Corp.
354 Elm Street
Buffalo

NORTH CAROLINA
Charles L. Burks & Co.
P.O. Box 1032
Black Mountain,
Cecil H. Wilson
Charles L. Burks & Co.
High Point Bonded Warehouse
419 S. Hamilton Street
High Point

OHIO
A. C. Mueller Co., Inc.
616 St. Clair Avenue, N.E.
Cleveland 14
The Paul Wiemer Co.
2089 Sherman Avenue
Norwood 12

OREGON
Cordano Chemical Co.
56 S. E. Belmont Street
Portland 14

PENNSYLVANIA
Campbell Chemical Co.
P.O. Box 486
Carnegie
American Mineral Spirits Co.
Colwells Lane (P.O. Box 348)
Conshohocken

TENNESSEE
Robert F. Sheahan Co.
P.O. Box 2654
Memphis

TEXAS
W. W. Richerson Co.
712 Unit 2 Santa Fe Building
Dallas,
Roy A. Ribelin Distributing Co.
570-AM & M Building
Houston 2

WASHINGTON
D. B. Smith Co.
1016 First Avenue, South
Seattle 4

WISCONSIN
J. W. Copps, Inc.
P.O. Box 116, Station F
Milwaukee

Mona Industries, Inc.

CALIFORNIA
Martin, Hoyt & Milne
906 East Third Street
Los Angeles
Martin, Hoyt & Milne
Merchants Exchange Bldg.
San Francisco

DELAWARE
H. D. Thornley Co.
901 Liftwood Road
Wilmington 3

NEW YORK
Ritter Chemical Co., Inc.
Amsterdam

WASHINGTON
Martin, Hoyt & Milne
1016 First Avenue So.
Seattle

Naftone, Inc.

CALIFORNIA
John K. Bice Co.
440 Seaton Street
Los Angeles 13
E. B. Taylor Company
442 Colyton Street
Los Angeles 13

COLORADO
L. H. Herr Company
Interstate Trust Building
Denver 2

FLORIDA
Palmer Supplies Company
211 East Robinson Avenue
Orlando

GEORGIA
Charles E. Baker, Inc.
1158 Avon Avenue, S.W.
Atlanta

ILLINOIS
Donald R. Fitzgerald Co.
5875 N. Lincoln Avenue
Chicago 45

KENTUCKY
C. L. McGuire and Co.
137 St. Matthews Avenue
Louisville 7

LOUISIANA
Breffeilh and Sheahan Company
P.O. Box 13222
New Orleans 25

MARYLAND
The Warner-Graham Co.
President & Fawn Sts.
Baltimore

MASSACHUSETTS
R. B. Huber, Sales Engineer
216 Tremont Street
Boston 16

MICHIGAN
Theo. F. Gehle Co.
603 Fisher Building
Detroit 2

MINNESOTA
Hawkins Chemical, Inc.
3100 E. Hennepin Avenue
Minneapolis 13

MISSOURI
Ack Sales Company
901 E. 13th Avenue
North Kansas City 16
Harry A. Baumstark & Company
6801 Hoffman Avenue
St. Louis 9

NEW YORK
John H. Calo Co., Inc.
19 Rector Street
New York 6

OHIO
Deeks & Co.
6433 Wiehe Road, Golf Manor
Cincinnati 13
Norman G. Schabel Co.
20950 Center Ridge Road
Cleveland 16

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland

PENNSYLVANIA
John J. McCullion
2615 East Westmoreland Street
Philadelphia 34
J. C. Ackerman Co.
Penn-Lincoln Hotel
Pittsburgh 21

TENNESSEE
Robert F. Sheahan Company
M & M Building—Room 728
P.O. Box 2654
198 South Main Street
Memphis

TEXAS
Van Waters & Rogers, Inc.
10216 Denton Road
Dallas
The E. B. McCullough Co.
2301 Commerce Street
Houston

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue
Seattle 4

Neville Chemical Company

CALIFORNIA
Paul W. Wood Company
2600 South Eastern Avenue
Los Angeles 22
Paul W. Wood Company
350 Townsend Street
San Francisco 7

DELAWARE
George Senn, Inc.
Philadelphia 34, Pa.

GEORGIA
George E. Missbach & Co.
Henry Grady Bldg.
Atlanta 3

ILLINOIS
Donald R. Fitzgerald
5875 N. Lincoln Avenue
Chicago 45

INDIANA
Harold C. Hall
Mariemont Hotel Bldg.
Cincinnati 27, Ohio

KENTUCKY
Harold C. Hall
Mariemont Hotel Bldg.
Cincinnati 27, Ohio

MARYLAND
George Senn, Inc.
Philadelphia 34, Pa.

MASSACHUSETTS
T. C. Ashley & Co.
683 Atlantic Avenue
Boston 11

MICHIGAN
C. L. Hueston Co.
16160 James Couzens Hwy.
Detroit 21
Krekel-Goetz Sales & Supply
302 Houseman Bldg.
Grand Rapids 2

MINNESOTA
P. E. Calo Company
6518 Walker Street
Minneapolis 26

MISSOURI
Morton-Myers Company
3201 Southwest Blvd.
Kansas City 8
Clifford L. Iorns Co.
216 S. 7th Street
St. Louis 2

NEW YORK
Commercial Chemicals, Inc.
211 Hertel Avenue
Buffalo 7
John H. Calo Company
19 Rector Street
New York 6

OHIO
Harold C. Hall
Mariemont Hotel Bldg.
Cincinnati 27
Ducros & Company
2860 E. 130th Street
Cleveland 20

PENNSYLVANIA
George Senn, Inc.
2200 E. Westmoreland Ave.
Philadelphia 34

TEXAS
W. W. Richerson Co.
712 Unit 2 , Sante Fe Bldg.
Dallas 2
E. B. McCullough Co.
2301 Commerce Street
Houston 2

WISCONSIN
Donald R. Fitzgerald
Chicago 13, Ill.

CANADA
Bate Chemical Corp., Ltd.
5165 Sherbrooke St., West
Montreal 28, Quebec
Canadian Mineral Spirits Co., Ltd.
38-40 Industrial St.
Toronto 17, Ont.

MEXICO
Comercial Tropical, S. A.
No. 60 Calle de Praga
3° y 4° Pisos
Mexico D. F.

The New Jersey Zinc Company

OREGON
Van Waters & Rogers
3950 N. W. Yeon Avenue
Portland 10

TEXAS
Van Waters & Rogers
10216 Denton Road
Dallas 1
Van Waters & Rogers
5403 Kirby Drive
Houston 5

WASHINGTON
Van Waters & Rogers
4000 First Avenue South
Seattle 4

WASHINGTON (cont'd)
Van Waters & Rogers
North 809 Washington St.
Spokane 1

CANADA
St. Lawrence Chemical Co.
5405 Pare Street
Montreal 16, Quebec
St. Lawrence Chemical Co.
47 Gurney Crescent
Toronto 10, Ontario
Van Waters & Rogers
650 Industrial Avenue
Vancouver 4, B.C.

Newport Industries Company

ALABAMA
Hulsey Brokerage Co.
115 South 35th Street
Birmingham

CALIFORNIA
S. L. Abbot Co.
4255 District Blvd.
Los Angeles 21
S. L. Abbot Co.
135 King Street
San Francisco

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver 2

GEORGIA
Southern States Chemical Co.
1061 W. Marietta St., N. W.
Atlanta 18

INDIANA
The August Hoffman Co.
P.O. Box 41115
Indianapolis 41

KANSAS
George C. Brandt, Inc.
3150 Figreglas Road
Kansas City 15

KENTUCKY
Lewis & Company
102 West Main Street
Louisville

MARYLAND
The Warner-Graham Co.
President & Fawn Sts.
Baltimore 2

MASSACHUSETTS
Mulcahy & Griffin, Inc.
141 Milk Street
Boston 9

MICHIGAN
Baker & Collinson
12,000 Mt. Elliott Avenue
Detroit 12

MINNESOTA
George C. Brandt, Inc.
3419 Pillsbury Avenue
St. Paul

MISSOURI
J. E. Niehaus & Co., Inc.
3419 Gratiot Street
St. Louis 3

NEW YORK
Ritter Chemical Company
Amsterdam
James O. Meyer's Sons
290 Larkin Street
Buffalo 10

NORTH CAROLINA
F. H. Ross Company
1649 W. Morehead Street
Charlotte
F. H. Ross Company
2802 Patterson Avenue
Greensboro

OHIO
J. H. Hinz Company
405 Rockefeller Bldg.
Cleveland 13

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland 10

PENNSYLVANIA
John D. Butts
Grant Building
Pittsburgh 19

TENNESSEE
Post Brokerage Company
814-10th Avenue North
Nashville

TEXAS
Roy A. Ribelin Dist. Co.
209 North Hawkins
Dallas 26
Roy A. Ribelin Dist. Co.
570-A M & M Building
Houston

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue, South
Seattle 4

WEST VIRGINIA
K. F. Brockell,
c/o Williamson Paint Co.
Charleston

CANADA
Drew, Brown, Ltd.
5410 Ferrier Street
Montreal 9
Drew Brown, Ltd.
50 Titan Road
Toronto 18

Norcross Corporation

CALIFORNIA
Jensen Instrument Co.
1919 Beverly Boulevard
Los Angeles 57
Jensen Instrument Co.
429 Bryant Street
San Francisco 7

ILLINOIS
J. B. McMahon
332 South Michigan Ave.
Chicago 4

LOUISIANA
Marshall, Neil & Pauley, Inc.
P.O. Box 4116
New Orleans

MICHIGAN
King Sales Corporation
12638 Woodrow Wilson Avenue
Detroit

NEW YORK
Murphy & Morse
P.O. Box 26
Kenmore, Buffalo 17

OHIO
Wilcox Engineering Co.
P.O.Box 16
Cincinnati 12
King Instrument Co.
P.O. Box 7283
Cleveland 29

OKLAHOMA
Arduser & Company
P.O. Box 4267
Tulsa

PENNSYLVANIA
Penn-Del Instrument Sales Co.
400 Bethlehem Pike
Philadelphia 18
King Instrument Co.
P.O. Box 10387
Pittsburgh

TEXAS
Marshall, Neil & Pauley, Inc.
3513 West Dallas Avenue
Houston 19

CANADA
W. J. Westaway Co. Ltd.
Main & MacNab Streets
Hamilton, Ontario
W. J. Westaway Co., Ltd.
7335 St. Lawrence Blvd.
Montreal, Quebec

Pacific Vegetable Oil Corp.

GEORGIA
G. R. Nottingham, Inc.
1257 Chattahoochee Ave., N.W.
Atlanta

ILLINOIS
Daniel G. Hereley Company
1607 Howard Street
Chicago

KENTUCKY
The Argus Company
305 Madrid Building
Louisville

MASSACHUSETTS
R. B. Huber
216 Tremont Street
Boston

MICHIGAN
George E. Moser & Son, Inc.
Penobscot Building
Detroit

MINNESOTA
Horton-Earl Company
324 N. First Street
Minneapolis

MISSOURI
Ack Sales Company
901 East 13th Avenue
North Kansas City 16
Ivan T. Bauman Company
817 North Second Street
St. Louis

OHIO
Donald McKay Smith Company
550 Hanna Building
Cleveland

OREGON
John C. Robinson
2505 S. E. 11th Street
Portland

PENNSYLVANIA
Baker Industrial Oils Co.
629 Chestnut Street
Philadelphia

TEXAS
W. W. Richarson Company
712 Unit 2, Sante Fe Building
Dallas
Texas Solvents & Chemicals Co.
8501 Market St.
Houston

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue South
Seattle

WISCONSIN
J. W. Copps
P.O. Box 116, Station F
Milwaukee

CANADA
B. & S. H. Thompson & Co.
651 Notre Dame St. West
Montreal
B. & S. H. Thompson & Co.
137 Wellington St. West
Toronto

Pennsylvania Color & Chemical Co.

CALIFORNIA
Horn, Jefferys & Co.
20 W. Burbank Blvd.
Burbank

ILLINOIS
D. G. Hereley Co.
1607 Howard St.
Chicago

MASSACHUSETTS
R. B. Huber
216 Tremont St.
Boston 16

OHIO
T. C. Kiesel
P.O. Box 93
Cincinnati 13
A. C. Mueller Co., Inc.
616 St. Clair Avenue, N.E.
Cleveland 14

WISCONSIN
J. W. Copps, Inc.
P.O. Box 116
Station F
Milwaukee 9

Pittsburgh Coke & Chemical Company

COLORADO
E. C. Stone Company
136 West 12th Street
Denver 4

CONNECTICUT
Naugatuck Chemical Division
U. S. Rubber Company
Elm Street
Naugatuck

CANADA
Mr. Harry S. Smith
Allied Basic Chemical Company
35 Anderson Avenue
Toronto 12 Ontario

Raybo Chemical Company

CALIFORNIA
L. H. Butcher Company
3628 East Olympic Blvd.
Los Angeles 23
L. H. Butcher Company
15th & Vermont Streets
San Francisco 1

ILLINOIS
Fred A. Jensen & Associates
510 North Dearborn Street
Chicago 10

KENTUCKY
Wm. B. Tabler Company
P.O. Box 1254
Louisville 1

LOUISIANA
Roy T. Cucullu Company
4818 Lancelot Drive
New Orleans 22

MARYLAND
Hayward Heubeck Company
1101 North Payson Street
Baltimore 17

MICHIGAN
J. W. Stark Company
12345 Schaefer Highway
Detroit 27

MINNESOTA
Willard N. Swanson Company
1015 North Third Street
Minneapolis 1

NEW YORK
Superior Materials, Inc.
120 Liberty Street
New York 6

OREGON
L. H. Butcher Company
2750 N. W. 31 Avenue
Portland 10

TEXAS
W. W. Richerson Company
712 Unit 2 Santa Fe Bldg.
Dallas 2

UTAH
L. H. Butcher Company
407 West 17th South Street
Salt Lake City 15

WASHINGTON
L. H. Butcher Company
1703 Sixth Avenue, South
Seattle 4

R-B-H Dispersions

CALIFORNIA
A. J. Lynch & Company
2424 Blanding Street
Alameda

A. J. Lynch & Company
4560 East 50th Street
Los Angeles 58

OREGON
Great Western Chemical Co.
2133 N. W. York Street
Portland 10

WASHINGTON
Great Western Chemical Co.
6921 East Marginal Way
Seattle 8

Reichhold Chemicals, Inc.

GEORGIA
Deeks & Company
1101 Zonolite Road, N. E.
Atlanta 6

MINNESOTA
George C. Brandt, Inc.
730 Pillsbury Avenue
St. Paul 14

MISSOURI
J. E. Niehaus & Company
3419-21 Gratiot Street
St. Louis 3

NEW YORK
C. Withington Co.
47-40 5th Street
Long Island City 1

OHIO
Deeks & Company
6433 Wiehe Road
Cincinnati 13

Ross & Rowe, Inc.

CALIFORNIA
A. J. Lynch & Co.
2424 Blanding St.
Alameda
A. J. Lynch & Co.
4560 E. 50th St.
Los Angeles 58

MASSACHUSETTS
R. T. Freeman Co.
Hingham Industrial Center
Hingham

MICHIGAN
Baker & Collinson, Inc.
12000 Mt. Elliott
Detroit 12

MINNESOTA
Horton-Earl Co.
324 North 1st St.
Minneapolis 1

MISSOURI
Morton-Myers Co.
Southwest Blvd. at State Line
Kansas City 8
Independent Oil Co.
3930-60 Chouteau Avenue
St. Louis 10

OHIO
John H. Thier Co.
2512 Highland Ave.
Cincinnati 19

TEXAS
Southwest Sales Co., Inc.
P.O. Box 9275
Dallas
Joe Coulson Co.
2525 Cline St.
Houston

UTAH
Naisbitt Sales Agency
3959 Sunny Dale Drive
Salt Lake City 17

WASHINGTON
D. B. Smith Co.
1016 First Ave., South
Seattle 4

St. Joseph Lead Company

ALABAMA
Harwick Standard Chem. Co.
Albertsville

ARKANSAS
Thompson-Hayward Chem. Co.
P.O. Box 413
North Little Rock

CALIFORNIA
Harwick Standard Chem. Co.
1248 Wholesale St.
Los Angeles
L. H. Butcher Co.
15th & Vermont St.
San Francisco

COLORADO
Application Engineers, Inc.
100 Jefferson St.
Englewood, (Denver Area)

FLORIDA
C. Withington Co., Inc.
1641 Landon Avenue
Jacksonville

GEORGIA
Southern States Chem. Co.
1061 W. Marietta St., N. W.
Atlanta

ILLINOIS
Fred A. Jensen & Assoc.
510 N. Dearborn St.
Chicago

INDIANA
Meyer Materials, Inc.
5505 No. Keystone
Indianapolis

KANSAS
Thompson-Hayward Chemical Co.
727 E. Osie
Wichita

MARYLAND
William McGill
237 President St.
Baltimore

MASSACHUSETTS
Harwick Standard Chemical Co., (of Mass.) Inc.
661 Boylston St.
Boston

MICHIGAN
Matteson-Van Wey, Inc.
403 Baltimore Avenue, W.
Detroit

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

MISSOURI
Thompson-Hayward Chemical Co.
2915 Southwest Blvd.
Kansas City

MISSOURI (cont'd)
J. E. Niehaus & Co., Inc.
3419-21 Gratiot St.
St. Louis

NEBRASKA
Thompson-Hayward Chemical Co.
1110 S. Fourth St.
Omaha

NEW JERSEY
R. E. Carroll, Inc.
P.O. Box 139
Trenton

NEW YORK
James O. Meyers' Sons
290 Larkin St.
Buffalo
C. Withington Co., Inc.
47-40 Fifth Street
Long Island City

NORTH CAROLINA
Southern States Chemical Co.
1039 Bond St.
Charlotte

OHIO
Harwick Standard Chemical Co.
60 S. Seiberling St.
Akron
C. L. Zimmerman Co.
N. 303 Cincinnati Union Terminal
Cincinnati

OKLAHOMA
Thompson-Hayward Chemical Co.
3909 Meridian Ave.
Oklahoma City 19

OKLAHOMA (cont'd)
Thompson-Hayward Chemical Co.
36 N. Guthrie
Tulsa

OREGON
Cordano Chemical Co.
56 S. E. Belmont St.
Portland

PENNSYLVANIA
Van Horn, Metz & Co., Inc.
241 E. Elm St.
Conshohocken, (Phila. Area)

PENNSYLVANIA
St. Joseph Lead Co.
Monaca, (Pitts. Area)

SOUTH CAROLINA
Southern States Chemical Co.
25 Peden St.
Greenville

TENNESSEE
Thompson-Hayward Chemica Co.
493 N. Front St.
Memphis

TEXAS
Thompson-Hayward Chemical Co.
P.O. Box 6226
Dallas
Thompson-Hayward Chemical Co.
P.O. Box 4557
Houston
Thompson-Hayward Chemical Co.
222 Seguin St.
San Antonio

WASHINGTON
Great Western Chemical Co.
1242 Sixth Avenue, So.
Seattle

J. Lee Smith & Co., Inc.

CALIFORNIA
A. J. Lynch & Co.
2424 Blanding St.
Alameda
E. B. Taylor Co.
442 Colyton St.
Los Angeles

COLORADO
L. H. Herr Co.
712 Interstate Trust Bldg.
16th & Lawrence Sts.
Denver

GEORGIA
Geo. E. Missbach & Co.
705 Henry Grady Bldg.
Atlanta

ILLINOIS
Fred A. Jensen & Associates
510 No. Dearborn St.
Chicago

KANSAS
Thompson-Hayward Chemical Co.
727 East Osie
P.O. Box 2897 South Wichita Station
Wichita

KENTUCKY
The Argus Co., Inc.
305 Madrid Bldg.
Louisville

LOUISIANA
Russell Chemical Co.
5932 Louis XIV St.
New Orleans

MARYLAND
A. B. Kohl Sales Co.
4615 Edmondson Ave.
Baltimore

MASSACHUSETTS
Barrett & Breen Co.
80 Federal St.
Boston

MICHIGAN
Theo. F. Gehle Co.
603 Fisher Bldg.
Detroit

MINNESOTA
Worum Chemical Co.
2130 Kasota Ave.
St. Paul

MISSOURI
Thompson-Hayward Chemical Co.
29th & Southwest Blvd.
Kansas City
H. R. Hamberg Co.
7273 Maryland Ave.
St. Louis

NEW YORK
James O. Meyer's Sons
Wilson Warehouse Inc.
290 Larkin St.
Buffalo

OHIO
The Paul Wiemer Co.
2089 Sherman Ave.
Cincinnati
A. C. Mueller Co., Inc.
616 St. Clair Ave., N. E.
Cleveland

OKLAHOMA
Thompson-Hayward Chemical Co.
36 No. Guthrie
Tulsa

OREGON
Great Western Chemical Co.
2133 N. W. York St.
Portland

PENNSYLVANIA
Mr. A. C. Hurlbrink
3701 No. Broad St.
Philadelphia
Joseph A. Burns & Son
124 Harrison Ave.
Pittsburgh

TEXAS
Texas Solvents & Chemicals Co.
2500 Vinson St.
Dallas
Texas Solvents & Chemicals Co.
8501 Market St.
Houston

WASHINGTON
L. H. Butcher Co.
1703 6th Ave., South
Seattle

CANADA
Chas. Tennant & Co., Ltd.
6555 Cote des Neiges Rd.
Room 440
Montreal, Que.
Chas. Tennant & Co., Ltd.
1303 Yonge St.
Toronto, Ont.

Sprayon Products, Inc.

CALIFORNIA
Bergdahl Associates
1485 Bayshore Boulevard
San Francisco

Standard Ultramarine & Color Co.

CALIFORNIA
Paul W. Wood Company
P.O. Box 6797
2600 South Eastern Ave.
Los Angeles 22
Paul W. Wood Company
350 Townsend Street
San Francisco 7

COLORADO
Thompson-Hayward Chemical Co.
501 West 13th Avenue
Denver

IOWA
Thompson-Hayward Chemical Co.
802 Fishertown Road
P.O. Box 176
Davenport
Thompson-Hayward Chemical Co.
Southwest First and Granger
Des Moines 15

KANSAS
Thompson-Hayward Chemical Co.
727 East Osie Street
Wichita 2

MASSACHUSETTS
L. E. Crossley
Room 435—80 Federal Street
Boston 10

MINNESOTA
Willard N. Swanson Co.
1015 North Third Street
Minneapolis 1

MISSOURI
Thompson-Hayward Chemical Co.
29th & Southwest Blvd.
Kansas City 8

NEBRASKA
Thompson-Hayward Chemical Co.
1110 South 4th Street
Omaha 8

OHIO
J. C. Drouillard Co.
264-66 Rockefeller Bldg.
Cleveland 13

OKLAHOMA
Thompson-Hayward Chemical Co.
3909 S. Meridian Ave.
Oklahoma City 19
Thompson-Hayward Chemical Co.
36 North Guthrie Street
Tulsa 3

PENNSYLVANIA
Jos. A. Burns & Son
124 Harrison Avenue
Pittsburgh 2

TEXAS
Thompson-Hayward Chemical Co.
P.O. Box 6226
2627 Weir Street
Dallas
Thompson-Hayward Chemical Co.
P.O. Box 4557
1701 Oliver Street
Houston

(TEXAS cont'd)
Thompson-Hayward Chemical Co.
P.O. Box 323
Lubbock
Thompson-Hayward Chemical Co.
P.O. Box 126, Grayston St. Sta.
222 Seguin Street
San Antonio 8

WISCONSIN
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